

DDL 102

Digital Signal Delay

- 1 in/2 out
- Set delay in cm, m, ft, in. or msec
- Store up to 30 presets
- Switchable edit protection
- Linear 16-bit data format; internally, 24-bit
- 90-dB S/N ratio
- Electronically balanced inputs/outputs
- Optional transformers

SPECIFICATIONS

Conditions:

1. 0 dBu = 0.775 volts rms.

OVERALL SPECIFICATIONS

Input/Output Configuration:

Mono 1 in/2 out

Maximum Delay:

1,086 msec

Delay Increments,

Time:

Milliseconds

Distance:

Centimeters, meters, feet, inches

Delay Resolution,

Time:

23 microseconds

Distance:

7.9 mm (0.312 in.)

Frequency Response:

20-20,000 Hz, +0.5/-2 dB

Number of Presets Storable:

30

Total Harmonic Distortion (1,000 Hz),

without Transformer:

<0.02%

with Transformer:

<0.2%

Signal-to-Noise Ratio:

>90 dB

Equalization,

Low-Frequency Shelving:

±14 dB at 100 Hz

High-Frequency Shelving:

±14 dB at 10,000 Hz

Front-Panel Controls:

Input gain control; Edit, Store, Select, Option, Enter and Value buttons; on/off switch

Front-Panel Displays:

LED level indicator (-24 dB to clip); 2 x 16-digit alphanumeric LCD multifunction display; edit mode indicator; lock mode indicator

Data Format:

Linear 16 bit, internally 24 bit

Common-Mode Rejection Ratio (CMRR):

>60 dB

Grounding:

Ground-lift switch disconnects ground from chassis to eliminate hum

Chassis Construction:

Painted steel

Colors,

Front Panel:

Gray with white nomenclature

Top and Sides:

Gray

Input and Bottom Panel:

Black with white nomenclature

Optional Accessories:

TRB-5 input transformer kit;

TRB-4 output transformer kit (two required)

Power Requirements:

90-250 volts, 50-60 Hz ac, no changes required, 15 watts maximum

Overall Dimensions (see Figure 1),

Height:

43.6 mm (1.72 in.)

Width:

483 mm (19.0 in.)

Depth:

256 mm (10.1 in.)

Net Weight:

3.5 kg (7.7 lb)

Shipping Weight:

5.0 kg (11 lb)

INPUT SPECIFICATIONS

Rated Input Voltage:

1.23 volts (+4 dBu)

Maximum Input Voltage:

9.0 volts (+21 dBu)

Input Impedance:

10,000 ohms

Input Configuration:

Electronically balanced (TRB-5 input transformer kit available)

Input Connectors:

Female three-pin XLR type, pin 2 hot

OUTPUT SPECIFICATIONS

Rated Output Voltage (0 dB):

1.23 volts (+4 dBu)

Maximum Output Voltage:

9.0 volts (+21 dBu)

Output Impedance:

100 ohms

Minimum Load Impedance:

600 ohms

Output Configuration:

Electronically balanced (TRB-4 output transformer kit available (two required))

Output Connectors:

Male three-pin XLR type, pin 2 hot

DESCRIPTION

The EV/Dynacord DDL 102 is a high-quality, one-in/two-out digital signal delay. The two delay outputs make it possible to serve up to two loudspeakers groups with different delay times, avoiding echo effects, increasing speech intelligibility and preserving directional realism when distributed loudspeakers have been used to supplement the coverage of a stage-located source cluster. The DDL 102 also may be used to achieve optimal alignment of adjacent loudspeaker elements, maximizing coverage uniformity in the audience area. Sports arenas,

DDL 102 SPECIFICATION GRAPHICS

FIGURE 1 — DDL 102 Dimensions

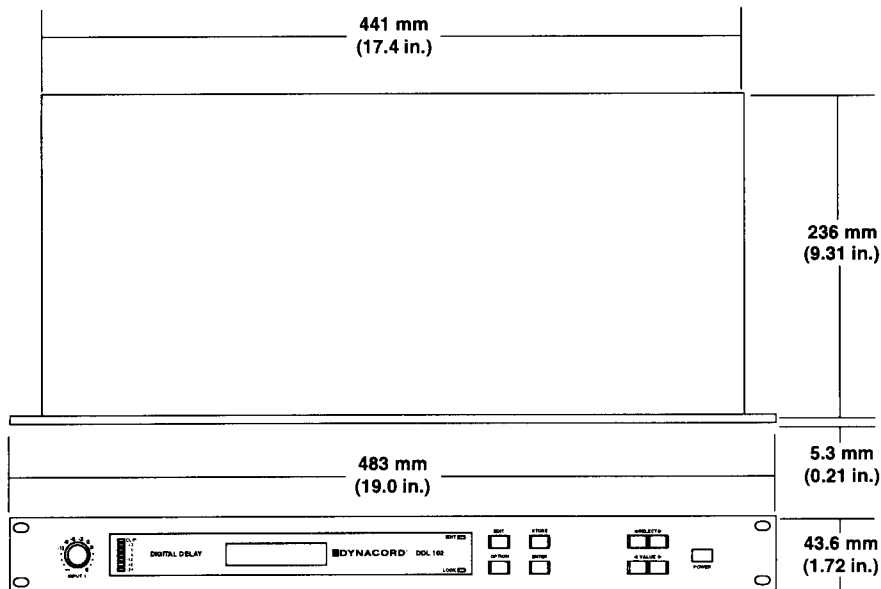


FIGURE 2 — DDL 102 Front and Rear Panels

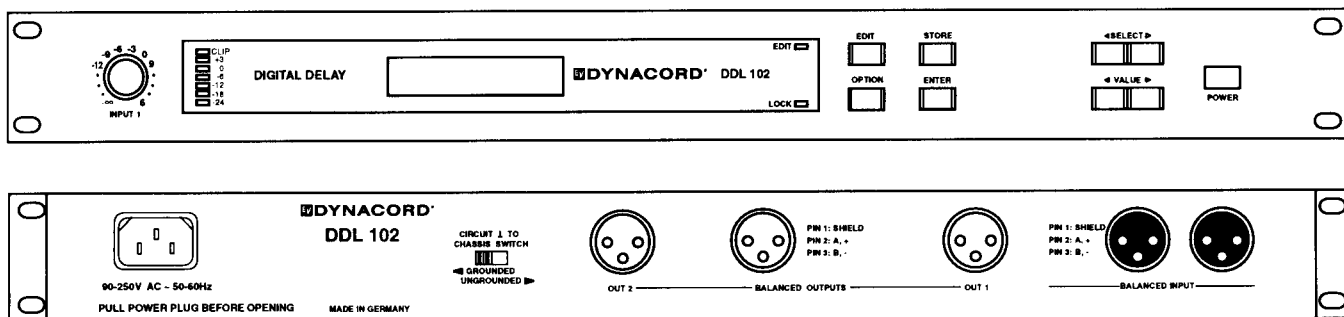
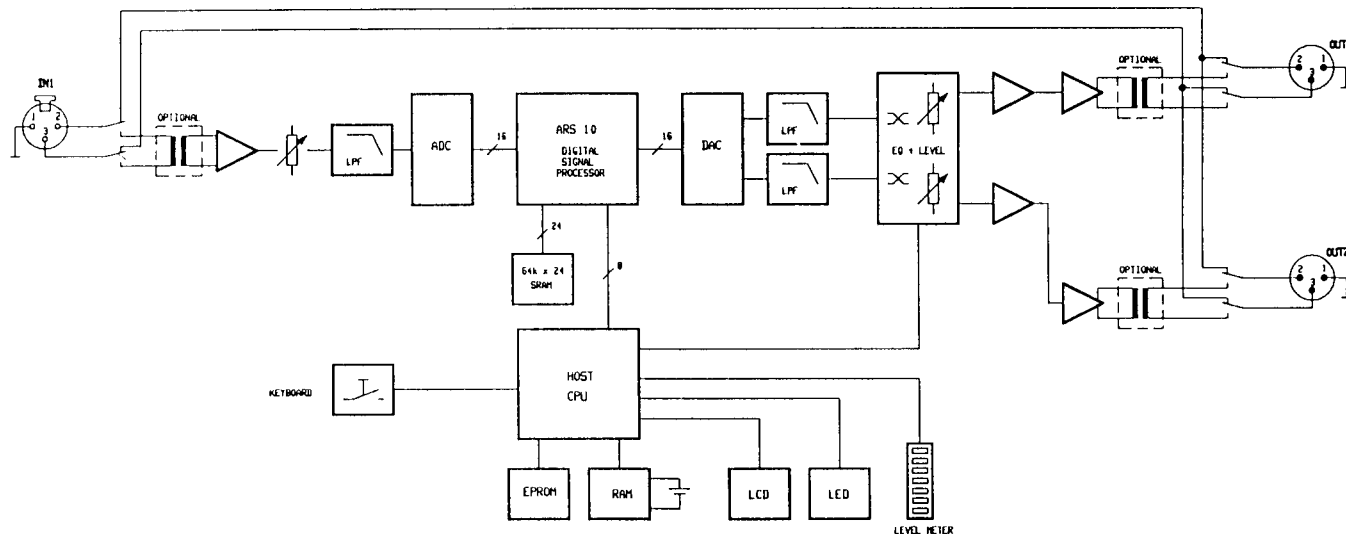


FIGURE 3 — DDL 102 Block Diagram



houses of worship, performing arts centers and large concert sound reinforcement rigs are some examples of systems that will benefit from the use of a DDL 102.

The DDL 102 has one electronically balanced input and two electronically balanced outputs, all of which may be transformer isolated with the optional TRB-5 (input) and TRB-4 (output) transformer kits. Each output may be delayed in units of time (milliseconds) or distance (centimeters, meters, inches and feet). Internally, the DDL 102 calculates in multiples of 23 microseconds, which provides a distance resolution of 7.9 millimeters (0.312 inches). Maximum delay time is 1,086 milliseconds, equivalent to 374 meters (1,227 feet). The input and output connectors are equipped with relays that automatically switch the unit to bypass in case of any internal malfunction.

The delayed output levels can be adjusted over the range of +16 dB to -63 dB relative to the input level. Separate low- and high-frequency equalization is provided, shelving ± 14 dB at 100 Hz and 10,000 Hz, respectively.

The memory section of the DDL 102 is capable of storing 30 presets. These presets may be titled to facilitate setup for a given system configuration. Presets may be "locked" via a menu-driven code to prevent unauthorized changes. Level matching is made easy by an input-level control and LED ladder that indicates internal clipping and has both peak and peak-hold ballistics.

The DDL 102 contains the ARS-10 proprietary digital signal processor surrounded by linear 16-bit A/D and D/A converters. Internally, the ARS-10 uses a 24-bit data format that ensures a high signal-to-noise ratio, very low noise, frequency response flat from 20 to 20,000 Hz, and excellent overall data transfer.

Front-panel ergonomics were carefully considered in the design of the DDL 102. The 2 x 16-digit LCD window displays the current memory with its delay settings. In the edit mode, the window displays information in an intuitive, numeric and graphic form that makes system setup easy.

The power supply of the DDL 102 adapts automatically to any voltage/frequency from 90 to 250 volts, 50 or 60 Hz. The rear-mounted IEC connector allows easy adaptation to any type of ac socket. A ground-lift switch ensures that any chassis-induced ac hum can be eliminated. The DDL 102 mounts in one EIA/IEC rack space. Mounting hardware is included.

The DDL 102 front and rear panels are shown in Figure 2. The block diagram is shown in Figure 3.

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The unit shall be a digital signal delay with one input and two outputs with independently adjustable delay times. Maximum delay time shall be 1,086 milliseconds. Delay shall be selectable in centimeters, meters, inches, feet or milliseconds. Delay resolution shall be 23 microseconds, corresponding to 7.9 mm (0.312 in.). Both outputs shall be equipped with equalization shelving ± 14 dB at 100 Hz and 10,000 Hz. Output levels shall be adjustable between +16 dB and -63 dB.

The unit shall be capable of storing 30 presets. All parameters shall be fully programmable and storable in any memory location. The unit shall have a lock mode to prevent unauthorized changes. Input and output connectors shall be equipped with relays to automatically switch the unit to bypass operation in case of internal malfunction.

Inputs and outputs shall be electronically balanced 3-pin XLR connectors, pin 2 positive. Internal receptacles shall be provided for retrofitting optional TRB-5 input and TRB-4 output transformers. The unit shall contain linear 16-bit A/D and D/A converters. The internal format shall be 24 bits. The unit shall meet the following performance specifications: frequency response, 20-20,000 Hz (+0.5/-2 dB); signal-to-noise ratio, >90 dB; THD, <0.02% at 1,000 Hz; nominal input and output voltages, 1.23 V (+4 dBu); input impedance, 10,000 ohms; maximum input and output voltages, 9.0 V (+21 dBu); output impedance, 100 ohms; and minimum load impedance, 600 ohms.

The unit shall operate on voltages from 90 V to 250 V ac, 50 to 60 Hz, without adjustment. Power consumption shall be 15 watts maximum. The unit shall be manufactured in accordance with all safety classes and fulfill all applicable interference suppression approvals (FCC, VDE and IED specifications). The unit shall be rack mountable in one EIA/IEC standard rack space. Dimensions shall be 43.6 mm (1.72 in.) x 483 mm (19.0 in.) x 256 mm (10.1 in.) hwd. Net weight shall be 3.5 kg (7.7 lb).

The signal delay unit shall be the EV/Dynacord DDL 102.

UNIFORM LIMITED WARRANTY

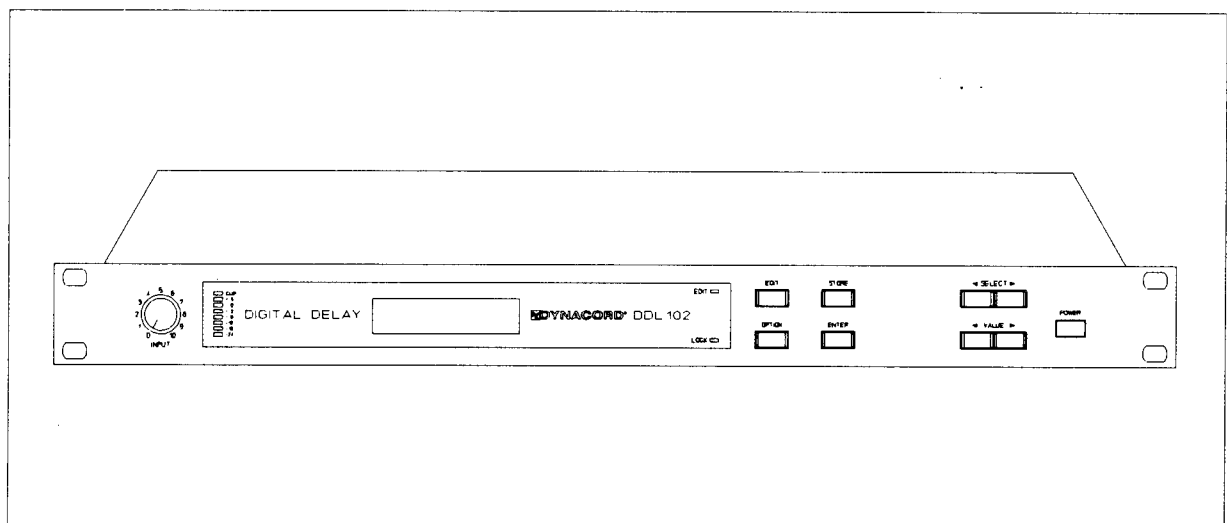
Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice at 600 Cecil Street, Buchanan, MI 49107 (616/695-6831 or 800/234-6831). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Electro-Voice and EV/Dynacord Electronics are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

Service and repair address for this product: Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107 (616/695-6831 or 800/234-6831).

Specifications subject to change without notice.

USER MANUAL



DDL 102

Digital Signal Delay Line

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1. INTRODUCTION

First of all we should like to thank and congratulate you for choosing the Digital Signal Delay DDL 102 from DYNACORD.

The DDL 102 is a 1-in-2 delay unit with max. delay time of more than 1 sec, enabling you an easy set-up of "distributed systems". This means that the delay times for sound from different loudspeaker groups to the audience can be compensated with the DDL 102, in order to avoid echo effects and increase speech intelligibility.

The DDL 102 has one input and 2 outputs, making it possible to delay 2 loudspeaker groups with different delay times. The time delay is adjustable in milliseconds or by entering the sound source distance in meters. The maximum delay time of 1086 msec corresponds with a length of approx. 373 metres.

All the DDL 102's inputs and outputs are electronically balanced XLR sockets. It is perfectly straightforward to retrofit transformers as an optional feature.

In this Owner's Manual you will find a lot more features of the DDL 102. Please read it through carefully and we guarantee that your new Digital Signal Delay DDL 102 from DYNACORD will give you great pleasure.

IMPORTANT NOTES

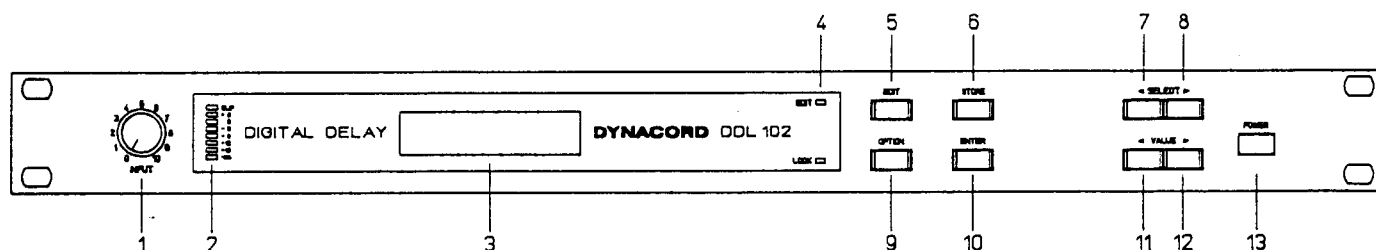
ATTENTION: This unit must be protected from damp because of fire risk and the possibility of electric shocks.

1. Make sure that nothing, especially no metal objects, are inserted into the device. This could result in a severe electric shock or malfunction.
2. If the unit is subjected to extreme fluctuations of temperature, e.g. on being transported from outside to a heated room, condensation can form. The unit should not be used until it has reached room temperature.
3. If water or any other liquid is spilt on to the unit accidentally, the unit should be switched off immediately and taken to a servicing facility to be checked.
4. Make sure that the unit is always well ventilated and never exposed to direct sunlight.
5. Do not use sprays to clean the unit as they have a detrimental effect on the unit and could ignite suddenly.
6. Inside the unit there is a battery to supply the RAM when the unit is switched off. This will ensure that your stored USER programs do not get lost. The service life of the battery is approx. 5 years. If the voltage drops below a minimum value, the following display appears after switching the unit on: "Service Required, Change Internal Battery". In this case contact the DYNACORD service center for changing the battery.

ON NO ACCOUNT SHOULD THE USER ATTEMPT TO DO THIS HIMSELF!

PANEL DESCRIPTION AND CONNECTIONS

2. PANEL DESCRIPTION AND CONNECTIONS



2.1 FRONT PANEL

1. INPUT control

This adjusts the input level of the DDL 102 to adapt the unit to different sound source output voltages.

2. Level indicator

This is for modulation monitoring, as the peak value of the input level is indicated. Another feature is the peak hold function which facilitates easy level matching.

3. Multi-functional display

This is a LC display involving 2 lines with 16 characters each. In PLAY mode the program number and delay configuration are indicated in the top line, while delay adjustments appear in the bottom line. In EDIT mode the parameter name and a graphic and numeric parameter value are indicated. Depending on the current status OPTION menus, status messages, user guide messages etc. appear.

4. Status/Mode LED's

These LED's show the DDL 102's current status. If the LED EDIT lights up, the EDIT mode is indicated. The LOCK LED shows that the DDL is in Write Protected Mode and no keyboard commands can be entered.

5. EDIT Key

This key changes the operation to EDIT mode. After pressing this key, the first parameter of the active program is shown. Further parameters are accessible via the SELECT keys. The value of the parameters shown can be changed via the VALUE keys. For further information please see "EDITING", chapter 5.2.

6. STORE Key

With this key the edited programs can be saved in any memory place (No. 01 - 30). For further information please see chapter 5.3 "SAVE AND COPY".

7. SELECT Key <

In play mode this key selects the previous memory place (activation via ENTER). In edit mode it is used for selecting parameters (always the previous parameter).

8. SELECT Key >

In play mode this key selects the next memory place (activation via ENTER). In edit mode it is used for selecting parameters (always the next parameter).

9. OPTION Key

This key allows access to the OPTION mode where special settings for the unit can be made or checked. For further information please see "OPTION", chapter 7.

10. ENTER key

In play mode this key activates a new selected program. The EDIT or OPTION mode is cancelled by ENTER and the user is returned to Play mode. For further information please see "OPERATION" on page 5-1.

11. VALUE key <

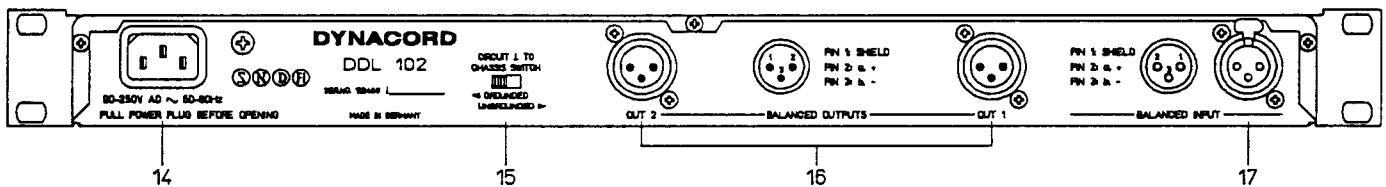
This key is used to decrease the value of the parameter displayed. If you keep the key pressed the parameter alteration is accelerated. The key is active in the EDIT and OPTION modes as well as on storing.

12. VALUE key >

This key is used to increase the value of the parameter displayed. If you keep the key pressed the parameter alteration is accelerated. The key is active in the EDIT and OPTION modes as well as on storing.

13. POWER switch

This key is used to switch the DDL 102 on and off.



2.2 REAR PANEL

14. Mains socket

The DDL 102 is started up by connecting the enclosed mains cable to the mains socket. The DDL 102 is designed for mains voltages of 90 V to 250 V, meaning that fluctuations in mains voltage present no problem!

15. Groundlift switch

The groundlift switch serves to prevent hum loops. If the DDL 102 is used together with other units in a 19" rack, the switch should be put on "GROUNDED". If the DDL 102 is used together with units which have different earthing potentials, the switch should be put on "UN-GROUNDED".

16. Sockets OUT1/OUT2

These are the two DDL 102's balanced outputs. In configuration "SINGLE DELAY" a signal is only present at OUT1.

The wiring for the inputs and outputs is explained in chapter 3.

17. Socket INPUT

This is the DDL 102's balanced input.

The wiring for the inputs and outputs is explained in chapter 3.

3. SETTING UP THE DDL 102

To achieve the best results with the DDL 102, the unit must be connected properly. To start the unit up, connect the enclosed mains connection cable with the DDL 102's mains socket and your mains outlet.

In order to avoid temperature problems the unit should be ventilated sufficiently and not operated at ambient temperatures above 40°C.

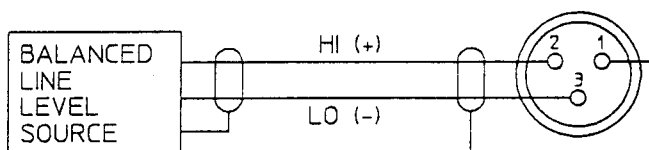
Before you switch on the DDL 102, all connections should be made according to your required configuration and wiring.

IMPORTANT:

- Always use well-screened audio cables.
- To avoid high frequency losses, the feeding lines, especially to the inputs, should not exceed 10 m.
- Do not position the unit directly on or under a power amplifier, TV monitor or the like, as the leakage field of the transformers in such devices could induce hum into the electronics of the DDL 102.

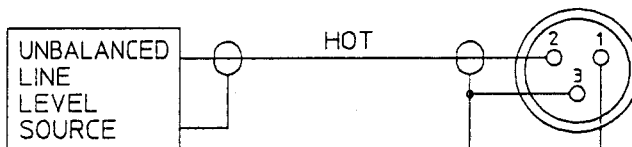
3.1 Balanced input wiring

Connect the non-inverting (+) lead of the cable to pin 2 of the XLR connector and the inverting (-) lead to pin 3 of the XLR connector. The screen is connected to pin 1 (SHIELD) of the XLR connector.



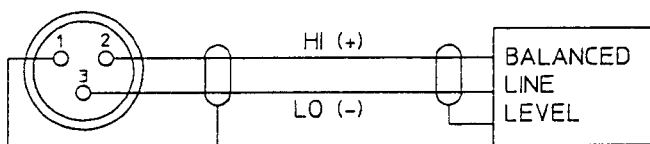
3.2 Unbalanced input wiring

Connect the "hot" lead of the cable to pin 2 of the XLR connector and the screen to pin 1 (SHIELD) of the XLR connector. In order to avoid a level loss of 6 dB, short Pin 1 and 3 of the XLR connector. If any noise occurs as result of this connection, disconnect it again.



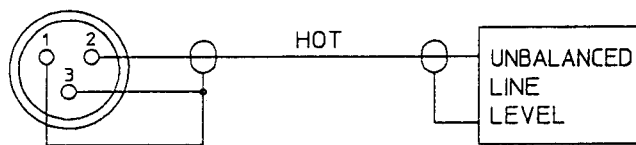
3.3 Balanced output wiring

Connect the non-inverting (+) lead of the cable to pin 2 of the XLR connector and the inverting (-) lead to pin 3 of the XLR connector. The screen is connected to pin 1 (SHIELD) of the XLR connector.



3.4 Unbalanced output wiring

Connect the "hot" lead of the cable to pin 2 of the XLR connector and the screen to pin 1 (SHIELD) of the XLR connector. In order to avoid a level loss of 6 dB, short Pin 1 and 3 of the XLR connector. If any noise occurs as a result of this connection, disconnect it again.



3.5 Position of the Groundlift switch

The groundlift switch serves to avoid hum loops. Depending on the operating mode it should be switched to the following positions:

UNGROUND: If you are using the DDL 102 together with units which have different earthing potentials.

GROUND: If you are using the DDL 102 together with other units in a 19" rack.

CIRCUIT 1 TO
CHASSIS SWITCH



◀ GROUND
UNGROUND ▶

4. START-UP

4.1 SWITCHING THE UNIT ON

- 1 The DDL 102 is switched ON via the POWER switch (13).

POWER



- 2 The following appears on the display:

DYNACORD DDL 102
SIGNAL DELAY

- 3 Subsequently the DDL 102 is ready for operation and is in Play Mode. The following may appear on the display:
The display means that you are in program 01 with the delay configuration SINGLE DELAY. The delay time for output 1 is adjusted to 100 ms.

01 SINGLE DELAY
100 ms

NOTE!

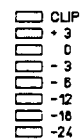
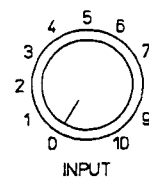
If the display on the right side appears after the unit has been switched on, you should contact the service center to change the internal battery.

In this case the battery voltage has dropped below a min. value and there is no guarantee as to whether your program data will be maintained in the memory after disconnecting the unit from the mains supply.

Service Required
Chng. Int. Battery

4.2 LEVEL SETTING

- 1 With the INPUT control (1) you can adjust the DDL 102's input level to the desired value.
- 2 While the level is being adjusted via the INPUT control (1), keep checking the maximum indication on the level meter (2). The optimum value is 0 dB. The CLIP LED indicates internal overdriving and should on no account light up.



5. OPERATION

The DDL 102 is operated by 8 function keys.

The DDL 102 contains 4 different modes which can be selected by the corresponding mode key directly from any state.

1. PLAY MODE

Mode after switching on
Program selection mode
Activation with ENTER key

2. EDIT MODE

Parameters are edited here.
Indication via EDIT LED
Activation via EDIT key

3. STORE MODE:

Storing and copying programmes
Activation via STORE key

4. OPTION MODE:

Editing functions pertaining to equipment
Switching the edit protection on and off
Activation via OPTION key

5.1 PROGRAM SELECTION

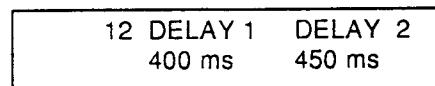
Programs can only be called up when the DDL 102 is in Play mode. This is the case after switching on, for example.

The DDL 102 contains 30 program memory places. Each program can be edited freely and can be saved to any memory place.

- 1 To call up a memory place you search for the program you want with the SELECT keys (7) and (8).



- 2 The new delay setting appears on the display and the program number on the left in the top line blinks.



- 3 Activate the program by pressing the ENTER key (10). The program number stops blinking.



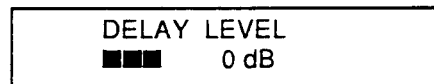
5.2 EDITING

Delay configurations and parameters are altered in EDIT Mode. For a description of all parameters please turn to chapter 6.

1 Press the EDIT key (5).



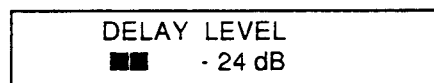
2 You are now in EDIT Mode. The EDIT LED lights up and the name and the value of the first parameter in the active program appear on the display. A graphic indication of the parameter value gives constant information as to one's current position in the parameter range.



3 The VALUE keys (11, 12) can now be used to alter the parameter value. If one of these keys is kept pressed, the parameter alteration is accelerated.



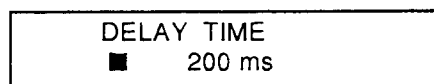
4 The set value appears on the display and the change is immediately audible. The EDIT LED then blinks to show that the program has been changed. If you do not wish to alter further parameters, proceed directly to point 7.



5 The SELECT keys (7) and (8) take the user to the next or previous parameter.



6 The following may appear on the display:



Points 3 to 6 can be repeated as often as required.

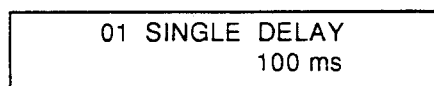
7 By pressing the key ENTER (10) you change back to Play Mode.



CAUTION! Your program alterations have not yet been stored and will be lost at the next program change!

8 The program number and the delay setting appear on the display. The EDIT LED continues to blink. There are several different possible ways of continuing:

- if you should wish to store the edited program in a memory, proceed to chapter 5.3.
- if you should wish to continue to alter parameters, go back to step 1.
- if you should require the original program again, press ENTER. The alterations of the parameter values are thus deleted. The EDIT LED goes off.

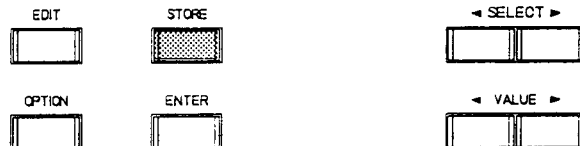


5.3 SAVE AND COPY

No matter whether you are saving an edited program or wish to copy a program from one memory place to another, the procedure is the same in both cases.

The storing procedure is initiated and ended via the STORE key (6). You can prevent storing by cancelling the procedure with any other key.

- 1 Press the STORE key (6) to start the storage procedure.



The following may appear on the display:

STORE PROGR. 07
TO PROGR. 07

- 2 Select the desired memory place via the VALUE keys (11, 12).

The following may appear on the display:

STORE PROGR. 07
TO PROGR. 16

- 3 Press ENTER (10) to confirm the selected program number. The display will show then:

CONFIRM = STORE
PGM 07 TO PGM 16

- 4 Final storage occurs by pressing the key STORE (6) again.

CAUTION! The previous program on this memory place will be deleted (overwritten)! Please make sure that the destination program number corresponds with the number you require. The storage procedure can be cancelled by pressing any other key.

The following may appear on the display after saving:

16 SINGLE DELAY
128 ms

6. DELAY CONFIGURATIONS AND PARAMETERS

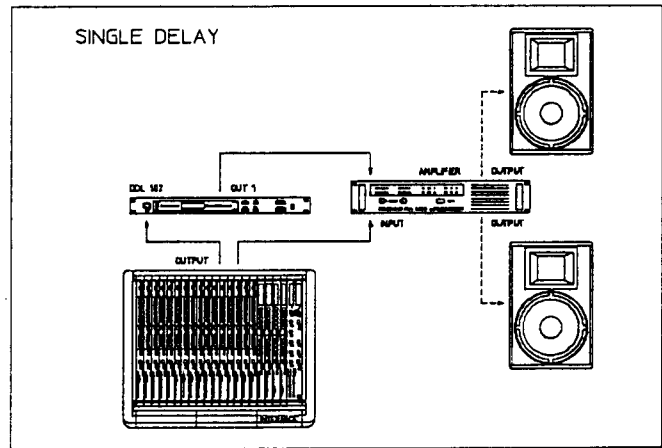
The DDL 102 has 2 different delay configurations or structures:

SINGLE DELAY

DELAY1 DELAY2

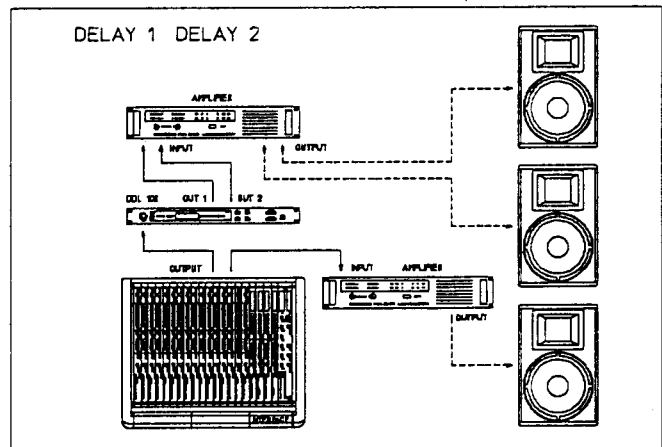
SINGLE DELAY is a delay line with one input and one output. This configuration can be used for situations where only one speaker group has to be delayed.

A typical SINGLE DELAY set-up is shown in the fig. on the right.



DELAY1 DELAY2 is a delay line with one input and two outputs. This configuration can be used for situations where two speaker groups have to be delayed individually.

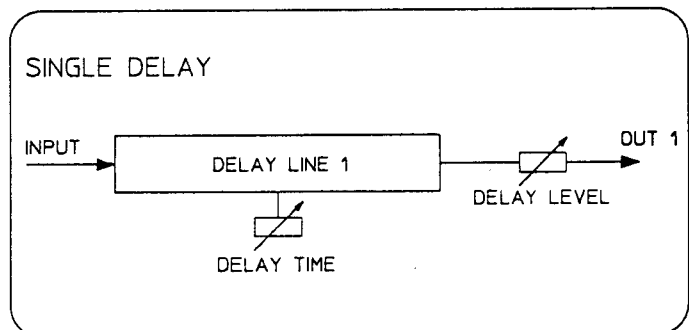
A typical DELAY1 DELAY2 set-up is shown in the fig. on the right.



6.1 SINGLE DELAY

This is a delay line with one input and one output. The delay time or the signal source distance and the volume can be adjusted and stored.

The following parameters are available:



DELAY CONFIGURATIONS AND PARAMETERS

DELAY LEVEL

Determines the level of the delayed signal for output 1. The reading appears in dB.

Valuation range: +16dB - -63 dB, -OFF-

DELAY LEVEL
■■■ -2dB

DELAY TIME

This parameter is used to set the delay time or the signal source distance for output 1. The reading appears in milliseconds, feet, inches, metres or centimetres.

Valuation range: 0 ms - 1086 ms
0 ft. - 1223 ft.
0 in. - 14685 in.
0 m - 373 m
0 cm - 37303 cm

DELAY TIME
■■■ 800 ms

DELAY TIME UNIT

Here the user can choose the unit of measurement for the delay line.

Distance settings are automatically calculated into delay times.

Settings: milli-sec.
feet
inch
meter
centimeter

DELAY TIME UNIT
milli - sec

EQ LOW

Raising or lowering the basses is set with this parameter. The corresponding filter has low-shelving characteristics.

Valuation range: -14dB - +14dB

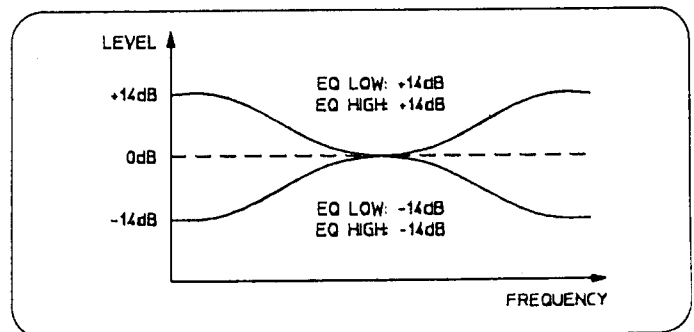
EQ LOW
■■■ -1 dB

EQ HIGH

Raising or lowering the trebles is set with this parameter. The filter has high-shelving characteristics.

Valuation range: -14dB - +14dB

EQ HIGH
■■■ +7 dB



CONFIGURATION

This is where you can select the delay configuration. The parameters and parameter names depend on the configuration selected.

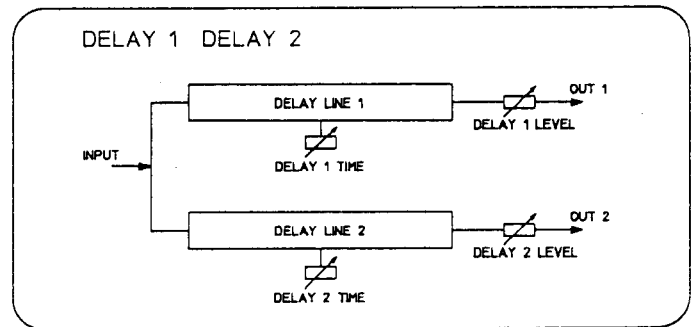
Settings: **Single Delay**
Delay 1 Delay 2

CONFIGURATION
Single Delay

6.2 DELAY 1 DELAY 2

This is a delay line with one input and two outputs. The delay time or the signal source distance and the volume can be adjusted individually for both outputs and are then stored.

The following parameters are available:



DELAY 1 LEVEL

Determines the level of the delayed signal for output 1. The reading appears in dB.

Valuation range: +16dB - -63 dB, -OFF-

DELAY 1 LEVEL
 ■■■ - 28 dB

DELAY 1 TIME

This parameter is used to set the delay time or the signal source distance for output 1. The reading appears in milliseconds, feet, inches, metres or centimetres.

Valuation range: 0 ms - 1086 ms
 0 ft. - 1223 ft.
 0 in. - 14685 in.
 0 m - 373 m
 0 cm - 37303 cm

DELAY 1 TIME
 ■■■■ 800 ms

DELAY 2 LEVEL

Determines the level of the delayed signal for output 2. The reading appears in dB.

Valuation range: +16dB - -63 dB, -OFF-

DELAY 2 LEVEL
 ■■■■ +16 dB

DELAY 2 TIME

This parameter is used to set the delay time or the signal source distance for output 2. The reading appears in milliseconds, feet, inches, metres or centimetres.

Valuation range: 0 ms - 1086 ms
 0 ft. - 1223 ft.
 0 in. - 14685 in.
 0 m - 373 m
 0 cm - 37303 cm

DELAY 2 TIME
 ■ 230 ms

DELAY CONFIGURATIONS AND PARAMETERS

DELAY TIME UNIT

Here the user can choose the unit of measurement for the delay lines.

Distance settings are automatically calculated into delay times.

Settings: milli-sec.
 feet
 inch
 meter
 centimeter

DELAY TIME UNIT
milli - sec.

EQ LOW

Raising or lowering the basses is set with this parameter. The corresponding filter has low-shelving characteristics.

Valuation range: - 14dB - +14dB

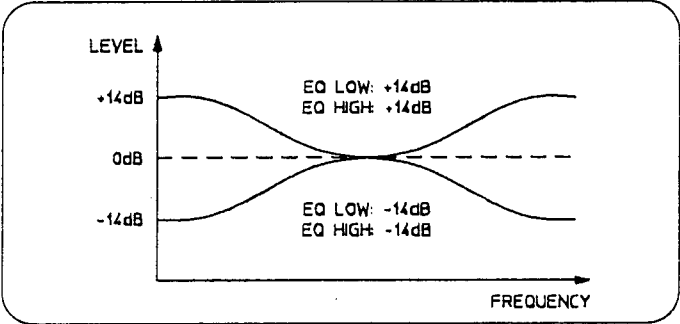
EQ LOW
■■■ - 1 dB

EQ HIGH

Raising or lowering the trebles is set with this parameter. The filter has high-shelving characteristics.

Valuation range: -14dB - + 14dB

EQ HIGH
■■■ + 7 dB



CONFIGURATION

This is where you can select the delay configuration. The parameters and parameter names depend on the configuration selected.

Settings: Single Delay
 Delay 1 Delay 2

CONFIGURATION
Single Delay

7. OPTION FUNCTIONS

The Option programs comprise a number of important additional functions and defaults, such as display of the software version, the setting of the LCD contrast, how the VU display should be set, etc.

- 1 Press the key OPTION (9) to activate the Option programs.



- 2 The Option program used last appears on the display, e.g.:



- 3 Find the Option required using the two SELECT keys (7, 8).
- 4 The two VALUE keys (11, 12) are used to set the Option values.
- 5 An Option program can be cancelled by pressing another MODE key, (e.g. return to Play Mode by pressing ENTER).



7.1 SETTING THE LCD CONTRAST

The LCD contrast or viewing angle can be adjusted between -10 (view from below) and +10 (view from above).



7.2 DISPLAY MODE OF THE LEVEL INDICATION

PEAK HOLD:

The Peak-Hold Function is switched on. This will help the user to set the level.

NO PEAK:

The Peak-Hold Function is switched off. The level display works normally.

SLOW:

In this setting the level display works with a long decay time constant, i.e. the indication decay is slower when the signal level decreases.



7.3 SWITCHING THE EDIT PROTECTION ON AND OFF

The DDL 102 also has an additional edit protection feature which can be switched on and off. This means that all the settings cannot be altered without entering a code number.

Enter a code number with the VALUE keys (11, 12) and confirm by pressing ENTER (10) and then STORE (6).

The following may appear on the display:

LOCK = ENTER
CODE NR: 000

CONFIRM = STORE
CODE NR: 008

If you wish to alter any of the unit's settings, the display will show:

SYSTEM
IS LOCKED!

In order to switch off edit protection, press the OPTION key once more and the display shows:

UNLOCK = ENTER
CODE NR: 000

Enter your Code number and press the ENTER key.

The following appears briefly on the display:

SYSTEM
IS UNLOCKED!

Now you can alter your settings again.

Note:

- If you have forgotten the Code No., you can switch off the Edit Protection, if you switch on the unit, while pressing the keys OPTION (9) and ENTER (10) simultaneously.

7.4 DISPLAY OF THE SOFTWARE VERSION NUMBER

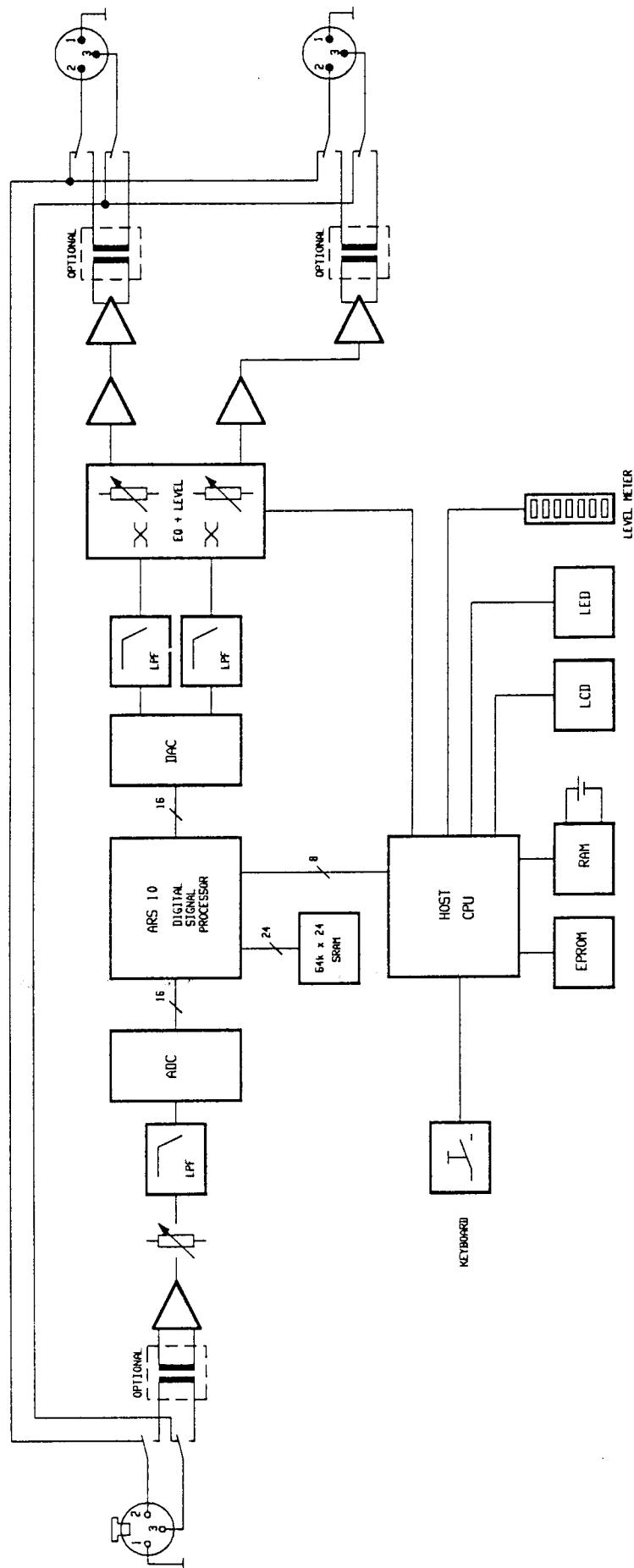
The display shows the software version of the DDL 102's signal processor, e.g. version 1.0.

DYNACORD DDL 102
Software V 1.0

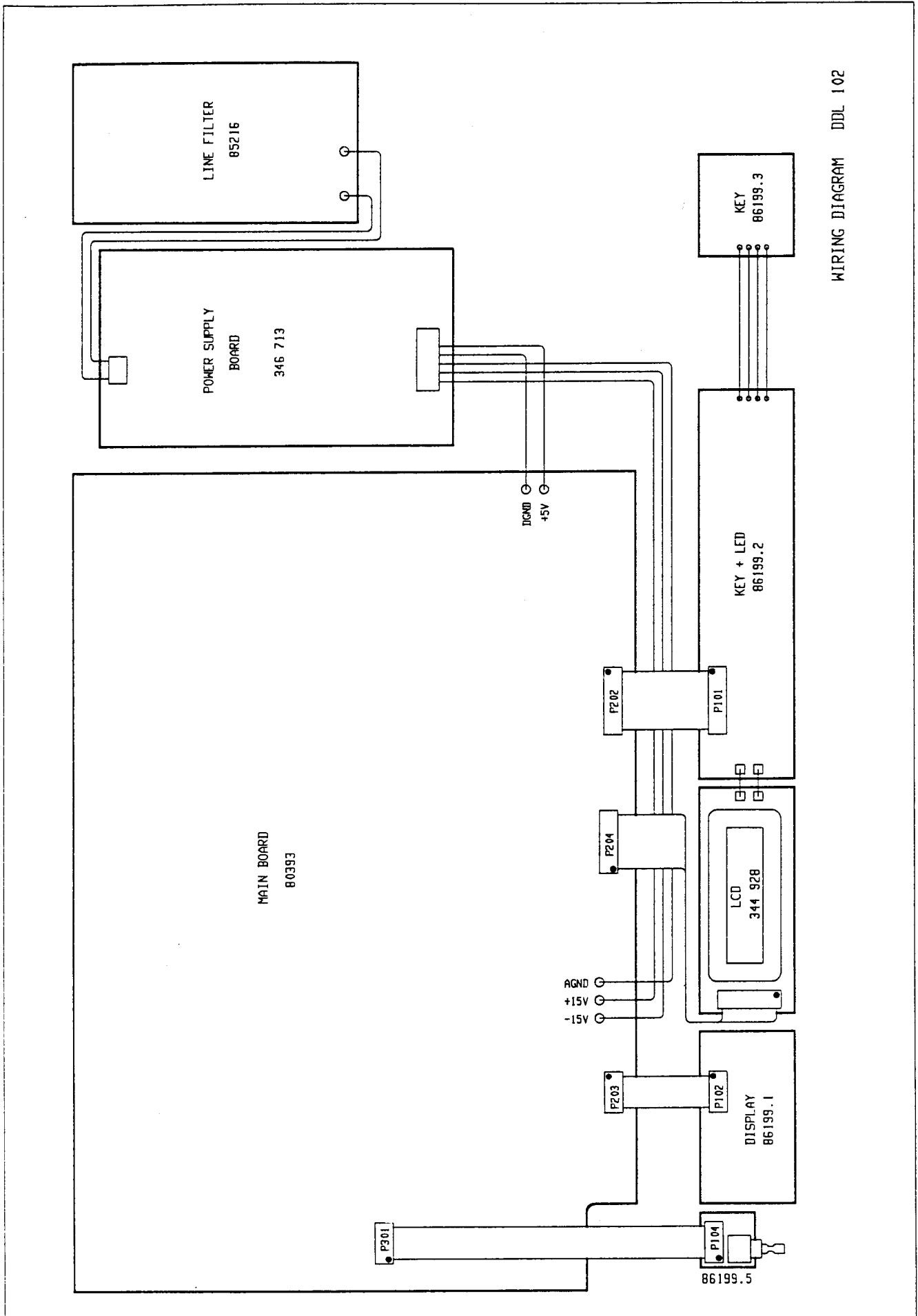
8.1 SPECIFICATIONS

| | |
|-------------------------|---|
| Mains voltage | 90 - 250 VAC / 50 - 60 Hz (without switching) |
| Power consumption | max. 15 W |
| Safety class | I |
| Input voltage | 1.23 V / +4 dBu |
| Max. input voltage | 9 V / +21 dBu |
| CMRR | > 60 dB |
| Input impedance | 10 kohms |
| Output voltage | 1.23 V / +4 dBu (LEVEL = 0 dB) |
| Max. output voltage | 8.7 V / +21 dBu |
| Output impedance | 47 ohms |
| Min. load impedance | 600 ohms |
| Frequency response | 20 Hz - 20 kHz +0.5 /-2 dB |
| S/N ratio | > 90 dB |
| THD without transformer | < 0.02% (1 kohm) |
| THD with transformer | < 0.2% (1 kohm) |
| EQ Low | +/- 14 dB (100 Hz) |
| EQ High | +/- 14 dB (10 kHz) |
| Max. Delay time | 1086 ms |
| Data format | 16 bit linear, internal 24 bit |
| Display | 2 x 16 digit alpha-numerical LCD with LED back lit |
| Ground Lift | Disconnects ground from housing |
| Dimensions (W X H X D) | 483 x 43.6 x 251 mm; 19" with 1 HU |
| Weight | 3.5 kg / 7.7 lbs |
| Retrfitting kits | NRS 90 185 (1 x input transformer) NRS 90 186 (1 x output transformer) |

The specifications for this product are subject to change without prior notice.



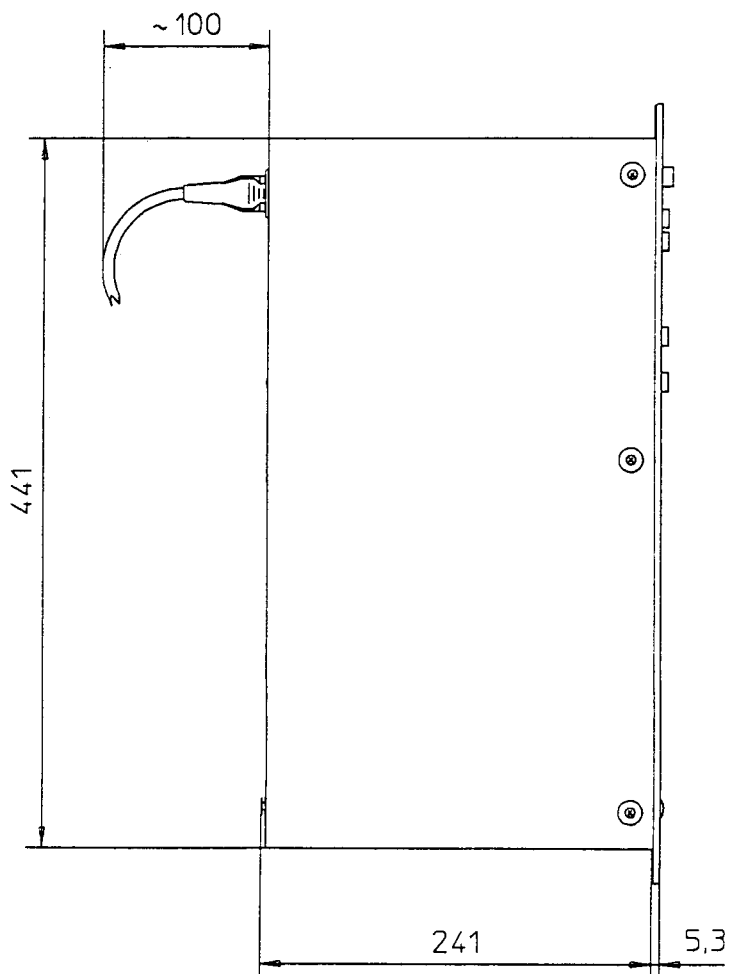
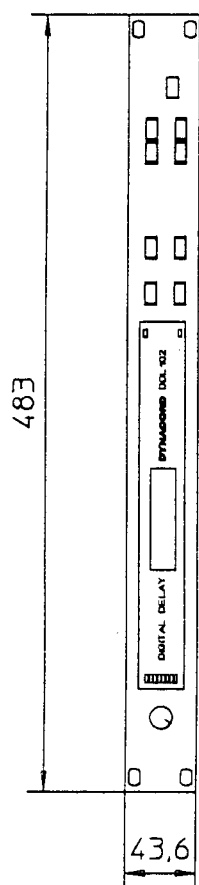
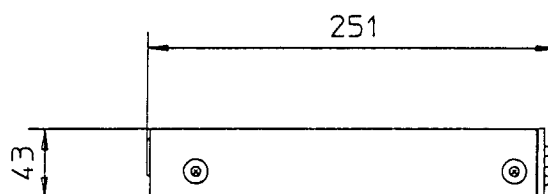
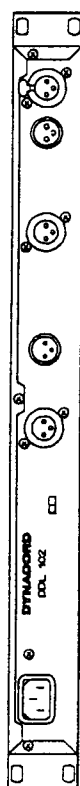
BLOCK DIAGRAM DDL 102



WIRING DIAGRAM DDL 102

DIMENSIONS

ABMESSUNGEN (in mm)
DIMENSIONS (in mm)



SERVICE

Measuring data DDL 102 - complete device

Agreements:

- all measurements and settings must be made after 2 minutes' warm-up.
- tolerances of the level values: +/- 1 dB
- the noise levels measured in dB at the outputs refer to the max. output level of +20.5 dBu.
- all level, frequency response and distortion measurements are performed with Audio Precision System One, generator impedance = 25 ohms.
- all distortion measurements are performed at an input level of -2 dBu, measurement bandwidth 10 Hz - 22 kHz.
- all level measurements at 1 kHz, DELAY LEVEL = 0 dB
- 0 dBu = 775 mV rms

1. Operating voltage EB(V) 90 - 250 VAC f = 50 - 60 Hz

| | | |
|-----------------------------------|------------|--------|
| 2. Operating current IB(A) | at 110 VAC | 170 mA |
| | at 230 VAC | 105 mA |

- measured with Philips Multimeter PM 2517 X

| | | |
|-----------------------------|------------|------|
| 3. Power consumption | at 110 VAC | 13 W |
| | at 230 VAC | 15 W |

- measured with Zaeres Wattmeter

4. Inputs

4.1. Input impedance $Z_i = 10 \text{ kohms}$

4.2. Input voltage

| | | | |
|-----------------------|-------|---|----------|
| - without transformer | E_I | = | 1.16 V |
| | | = | +3.5 dBu |

| | | | |
|--------------------|----|---|--------|
| - with transformer | EI | = | 1.23 V |
| | | = | +4 dBu |

| | | | |
|----------------------|------------|---|---------|
| - max. input voltage | E_{lmax} | = | 8.7 V |
| | | = | +21 dBu |

4.3 Common Mode Rejection Ratio (CMRR)

- $f = 1 \text{ kHz}$
- without transformer 60 dB
- with transformer 45 dB

5. Outputs

5.1. Output impedance $Z_o = 100 \text{ ohms}$

5.2. Output voltage

- measured at 100 kohms load impedance

| | | | |
|-----------------------|-------|---|----------|
| - without transformer | E_0 | = | 1.3 V |
| | | = | +4.5 dBu |

| | | | |
|--------------------|----------------|---|----------|
| - with transformer | E ₀ | = | 1.15 V |
| | | = | +3.5 dBu |

- measured at 600 ohms load impedance

| | | | |
|-----------------------|----------------|---|----------|
| - without transformer | E ₀ | = | 1.2 V |
| | | = | +3.8 dBu |

| | | | |
|--------------------|----------------|---|----------|
| - with transformer | E ₀ | = | 0.9 V |
| | | = | +1.5 dBu |

- max. output voltage

$$E_{\text{Imax}} = 8.7 \text{ V}$$

- measured at 100 kohms load impedance

| | | | |
|-----------------------|----------------|---|---------|
| - without transformer | E ₀ | = | 8.7 V |
| | | = | +21 dBu |

| | | | |
|--------------------|----------------|---|---------|
| - with transformer | E ₀ | = | 8.7 V |
| | | = | +21 dBu |

- measured at 600 ohms load impedance

| | | | |
|-----------------------|-------|---|-----------|
| - without transformer | E_o | = | 8.2 V |
| | | = | +20.5 dBu |

| | | | |
|--------------------|----------------|---|---------|
| - with transformer | E ₀ | = | 6.9 V |
| | | = | +19 dBu |

5.3. Frequency response

5.3.1 Frequency response see page 25

5.4. Distortion (THD)

5.4.1 Distortion (THD) - without transformer see page 25

5.4.2 Distortion (THD) - with transformer see page 25

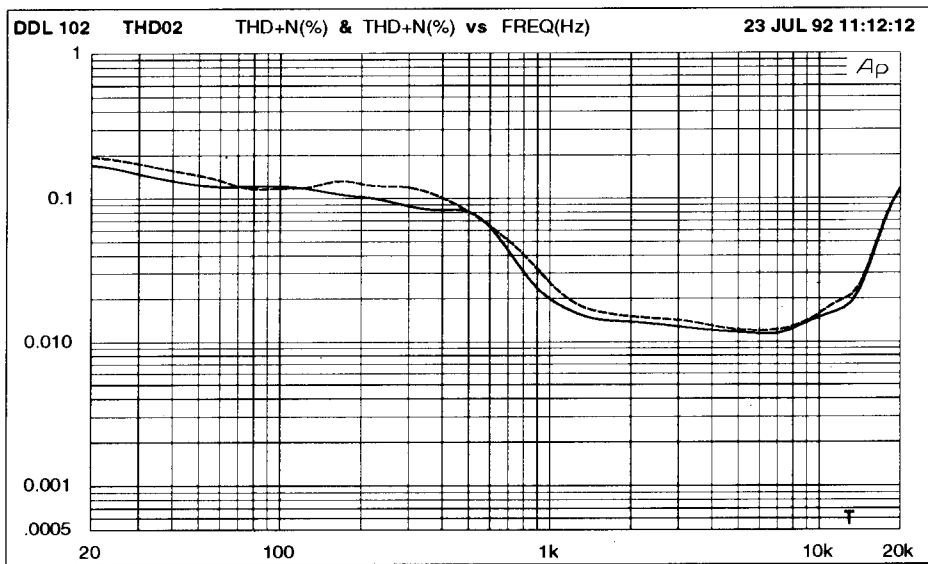
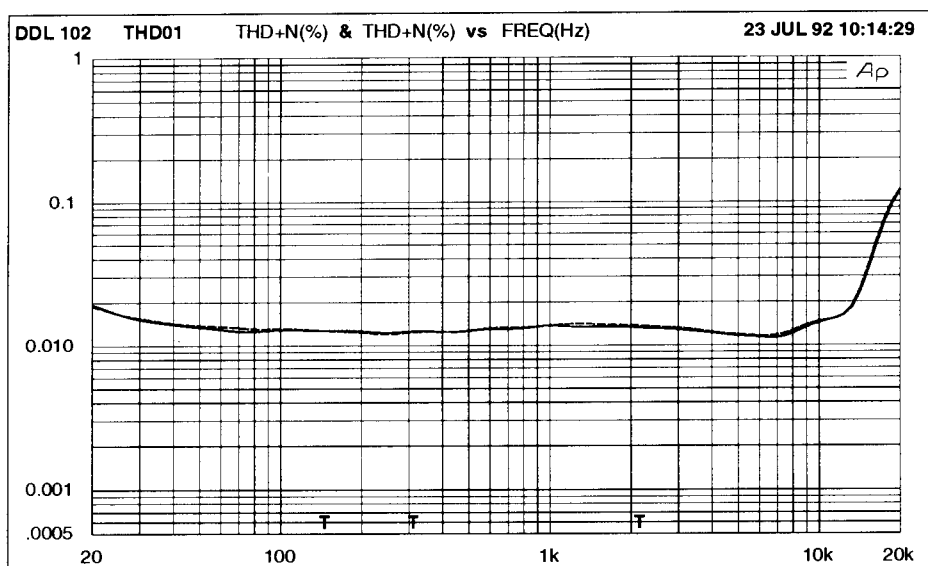
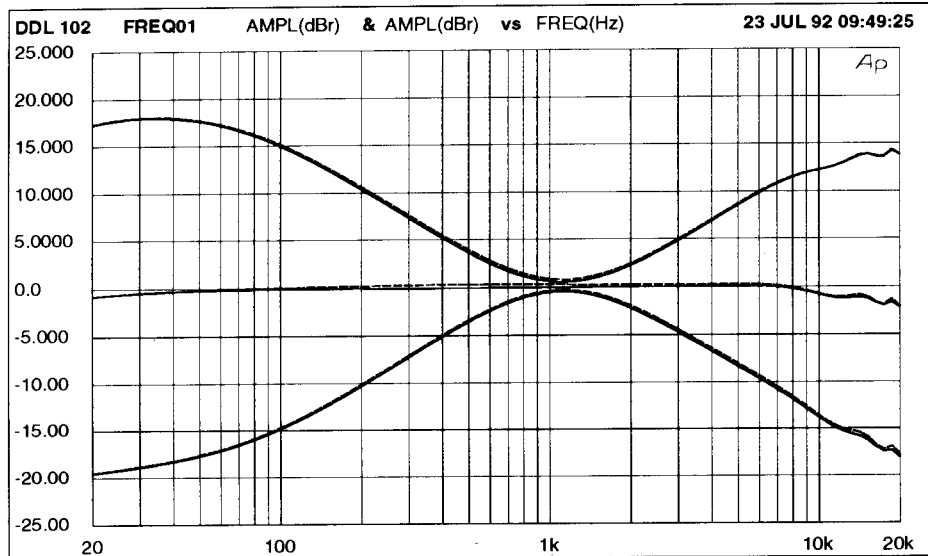
NOTE! Before carrying out the distortion factor measurement the unit must be allowed to warm-up for a duration of 5 minutes and then the converter must be adjusted to minimum distortion (THD) with the test program "MSB ADJUST".

5.5 Noise voltages

| | | |
|----------------------------------|---|-------------|
| Noise voltage (quasi peak level) | = | 480 V |
| | = | -84 dB |
| CCIR 468 (quasi peak level) | = | 1 mV |
| | = | -77 dB |
| dB(A) (r.m.s.) | = | 220 μ V |
| | = | -90 dB |

6. Specifications

| | |
|--|---|
| Mains voltage | 90 - 250 VAC / 50 - 60 Hz (without switching- over) |
| Power consumption | max. 15 W |
| Safety class | I |
| Input voltage | 1.23 V / +4 dBu |
| Max. input voltage | 8.7 V / +21 dBu |
| CMRR | 60 dB |
| Input impedance | 10 kohms |
| Output voltage | 1.3 V / +4.5 dB |
| Max. output voltage | 8.7 V / +21 dB |
| Output impedance | 100 ohms |
| Min. Load | 600 ohms |
| Frequency response | 20 Hz - 20 kHz (+0.5/-2 dB) |
| S/N ratio | 90 dB |
| Distortion (THD) - without transformer | 0.02% (1 kHz) |
| Distortion (THD) - with transformer | 0.2% (1 kHz) |
| Max. delax time | 1086 ms |
| Data format | 16 bit linear, internally 24 bit |
| Display | 2 x 16 digit alphanumerical LCD with LED back lit |
| Ground lift | separates circuit ground from chassis |
| Dimensions (WxHxD) | 483 x 43.6 x 260 mm, 19", 1HU |
| Weight | 3.5 kg / 7.7 lbs |



DDL102 - Test Programs

The DDL102 integrates 11 test programs to check internal function blocks.

Pressing the keys "EDIT" and "OPTION" simultaneously gives access to the test mode. The following message appears briefly in the display:

TEST MODE FOR SERVICE ONLY

The test programs can be selected by means of the "SELECT" or "VALUE" keys and called up by "ENTER".

Generally speaking, the "ENTER" key also serves to abort a test.

The test mode is exited from the program "QUIT + RESET" via "ENTER".

List of the test programs:

- μP-ROM TEST
- μP-RAM TEST
- ARS RAM TEST
- BATTERY TEST
- MSB ADJUST
- EFFECT SIGNAL
- AUDIO TESTS
- LED TESTS
- DISPLAY TEST
- KEY TEST
- QUIT + RESET

Explanation of the test programs:

Test program 1:

μP-ROM TEST
START = ENTER

When "ENTER" is pressed the display changes to:

Testing μ P-ROM

and the EPROMs of the host processor are checked. A check sum is calculated from the entire contents of the EPROMs. The test cannot be interrupted! If no error is found, the following appears in the display:

μP-ROM TEST OK!

< >

If an error is detected the following appears:

μP-ROM TEST FAIL

<hecks:XXh>

Test program 2:

μP-RAM TEST
START = ENTER

This program serves to check the static RAMs in the DDL102's processor system. To do so, various bit patterns are written to all RAM addresses and re-read.

NOTE! All alterations in the delay programs will be lost during this test. All program parameters are reset to the factory default values!

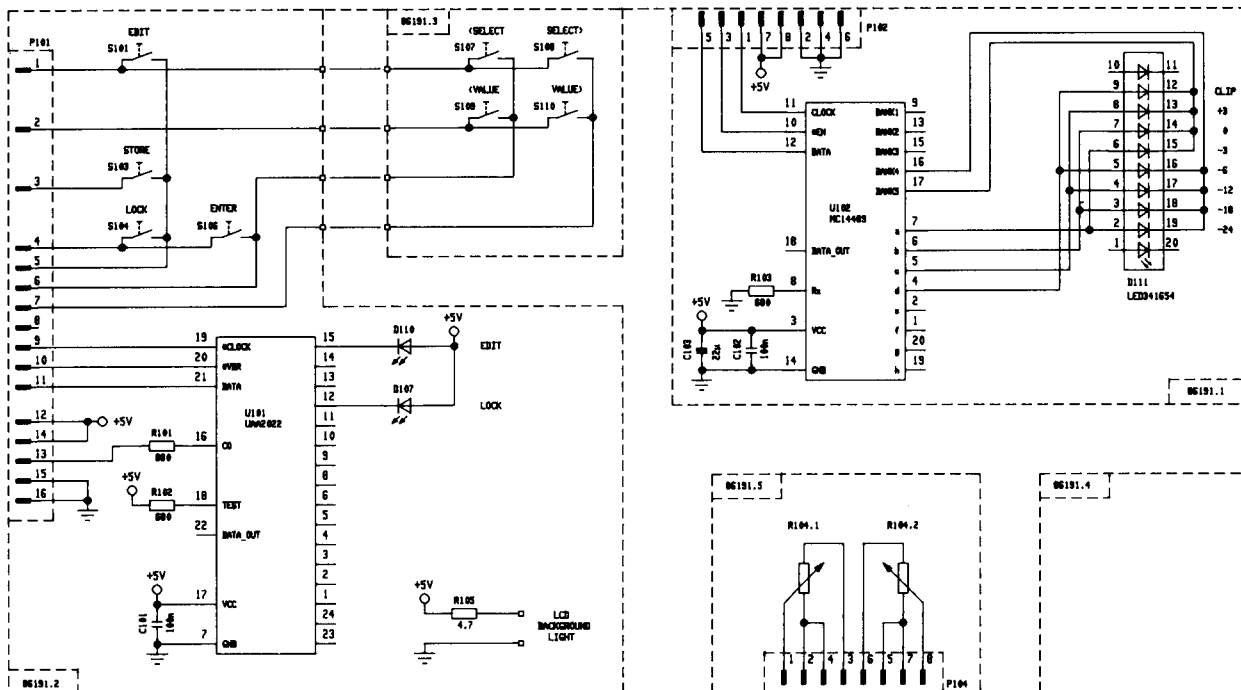
When "ENTER" is pressed the following message appears in the display:

**Warning: Data in
RAM will be lost**

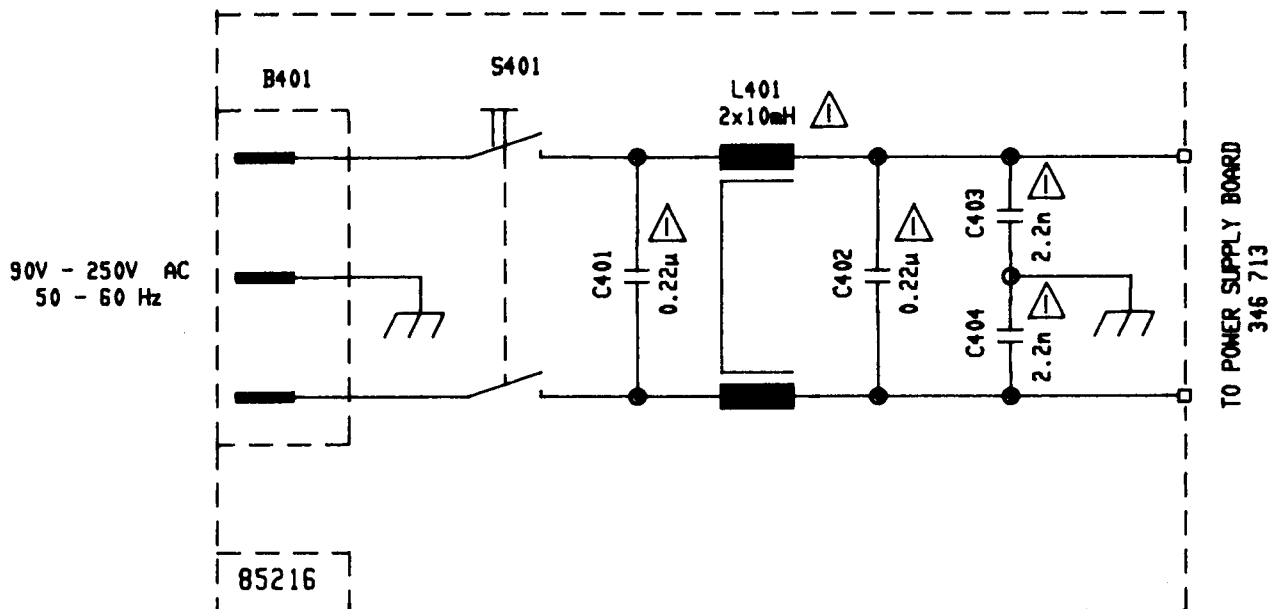
By pressing "ENTER" the test program is started and the following appears in the display:

Testing μ P-RAM

...

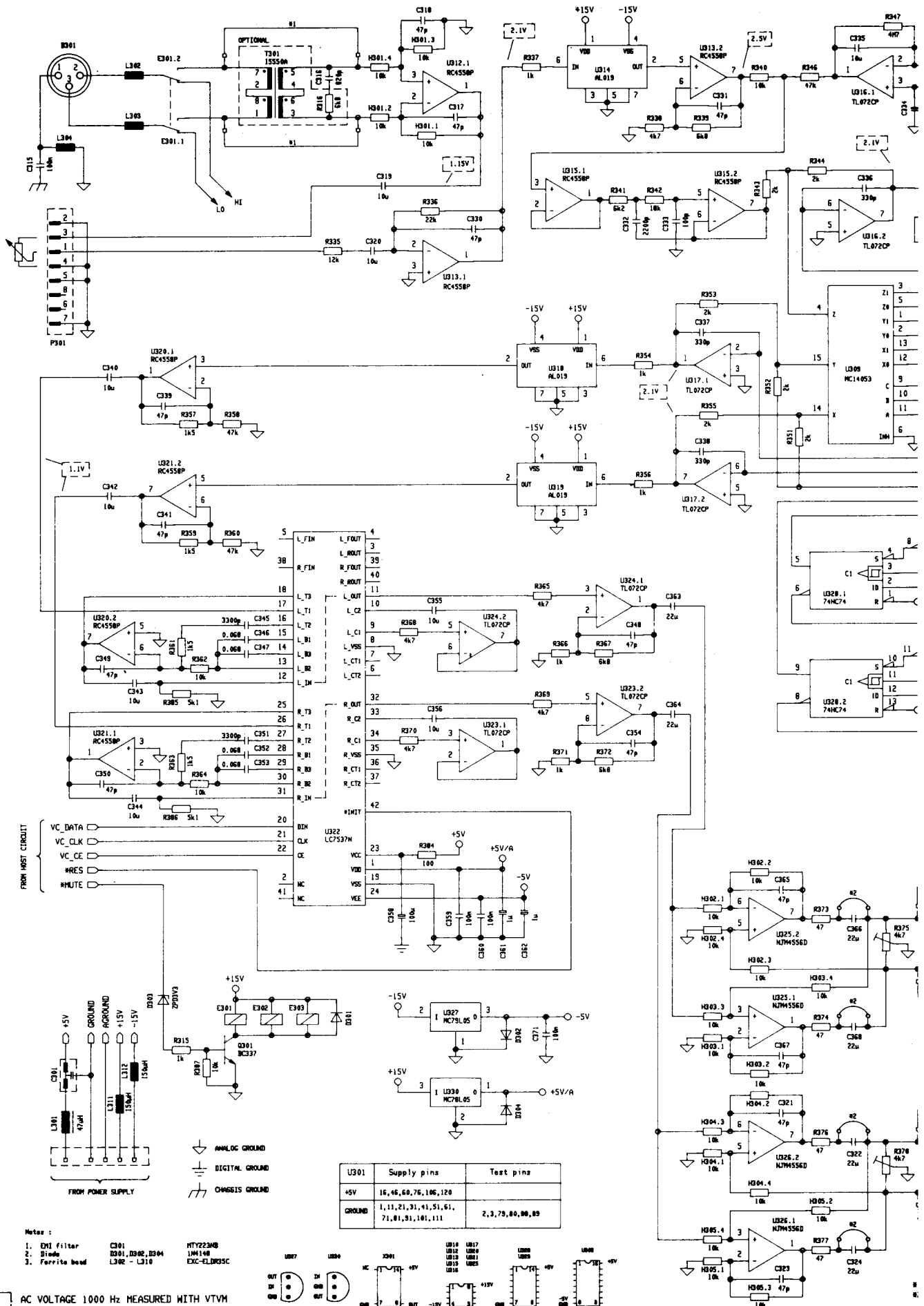


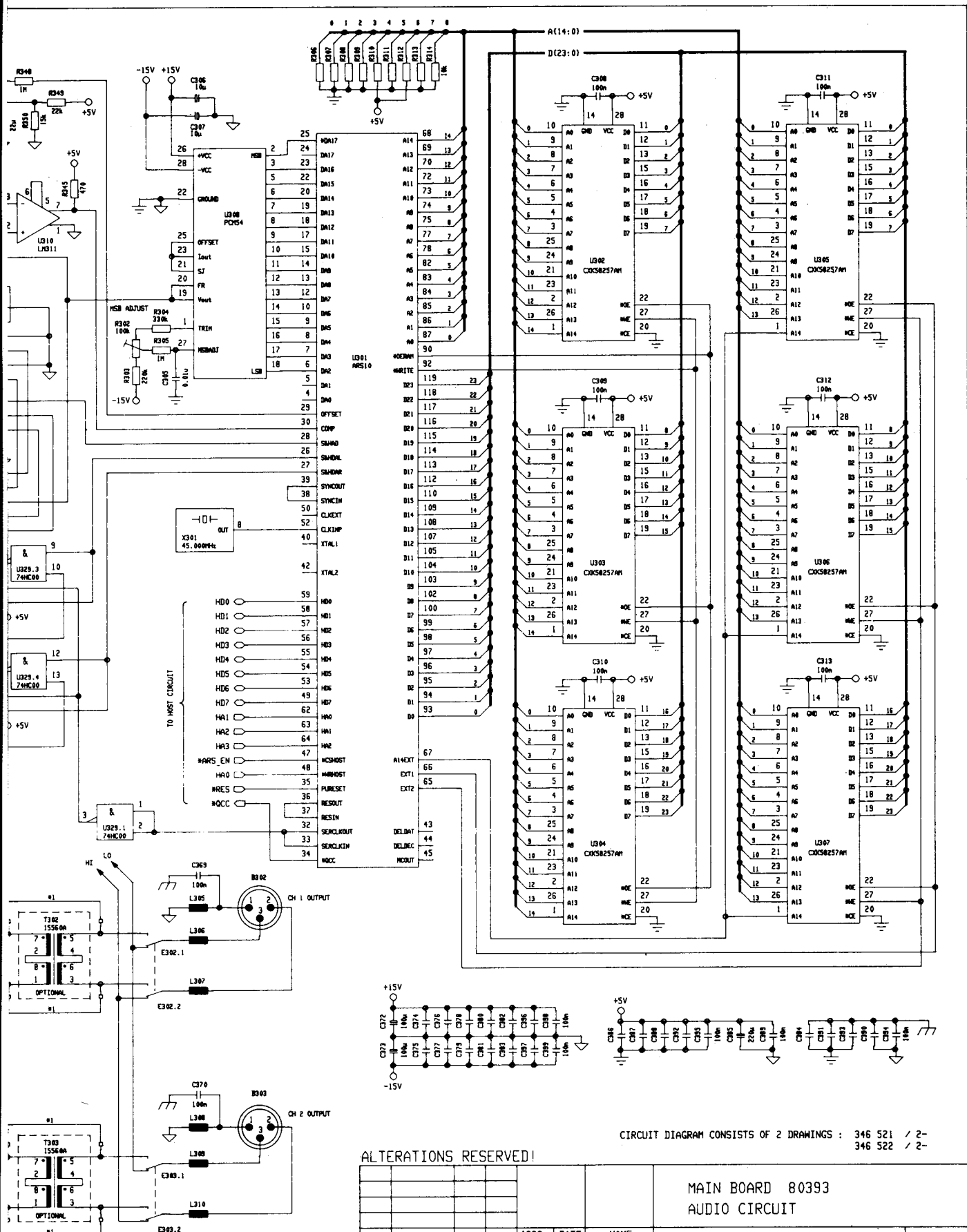
| | |
|-------------------|----|
| FRONT BOARD 86199 | |
| CIRCUIT DIAGRAM | |
| 346 601 | 3- |
| DDL 102 | |



SAFETY COMPONENT
(MUST BE REPLACED BY ORIGINAL PART)

| | |
|-------------------|----|
| LINE FILTER 85216 | |
| CIRCUIT DIAGRAM | |
| 344 859 | 4- |
| | |

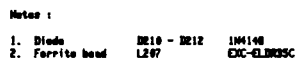


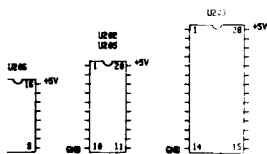


CIRCUIT DIAGRAM CONSISTS OF 2 DRAWINGS : 346 521 / 2-
346 522 / 2-

ALTERATIONS RESERVED!

| | | | | MAIN BOARD 80393 AUDIO CIRCUIT | |
|-------|--|-------|-------|-----------------------------------|-----------|
| | | 1993 | DATE | NAME | |
| | | DSG'D | 26.01 | Kaup | |
| | | CHK'D | | | |
| | | APP'D | | | |
| SYMB. | | | | REVISION | |
| DATE | | | | NAME | |
| | | | | DYNACORD | |
| | | | | 346 521 | |
| | | | | BDL 102 | |
| | | | | | SHEET 1/2 |
| | | | | | 2- |





ALTERATIONS RESERVED!

32

| Pos. in diagram | description | Part-No. | Pos. in diagram | description | Part-No. |
|-----------------|-----------------------------|----------|-----------------|---------------------------|----------|
| 00010 | plexiglas panel DDL 102 EV | 348067 | U 204 | IC CXK 58256 P-12L | 339671 |
| 00040 | push button black 12,5x7 | 337059 | U 205 | IC SN 74 HC245 N | 338389 |
| 00050 | push button black 6,4x 13,4 | 342496 | U 206 | IC MC 74 HC138 N | 339705 |
| 00060 | rotary knob black 16 | 342120 | U 207 | IC MC 74 HC 32 N | 331929 |
| 00080 | power supply | 346713 | U 208 | IC MC 74 HC 00 N | 331920 |
| 00090 | display | 344928 | U 210 | IC TL 7705 | 335857 |
| | | | U 213 | IC TL 072 CP | 331340 |
| 00010 | PCB DDL 102 | 803938 | U 301 | IC MB 635213 | 344923 |
| B 301 | XLR socket 3 pol. | 341945 | U 302 | IC CXK 58257 | 344927 |
| B 302 | XLR connector 3 pol. | 341944 | U 303 | IC CXK 58257 | 344927 |
| B 303 | XLR connector 3 pol. | 341944 | U 304 | IC CXK 58257 | 344927 |
| BT201 | battery | 341655 | U 305 | IC CXK 58257 | 344927 |
| C 204 | KO-EL 220 MF 25V | 343533 | U 306 | IC CXK 58257 | 344927 |
| C 301 | safety component | 343489 | U 307 | IC CXK 58257 | 344927 |
| C 361 | KO-EL 1 MF 50V | 340520 | U 308 | IC PCM 54 HP | 339670 |
| C 362 | KO-EL 1 MF 50V | 340520 | U 309 | IC MC 14053 BCP | 335501 |
| C 385 | KO-EL 220 MF 25V | 343533 | U 310 | IC LM 311 | 330767 |
| D 210 | diode 1N 4148 | 301254 | U 312 | IC RC 4558 P | 304275 |
| D 211 | diode 1N 4148 | 301254 | U 313 | IC RC 4558 P | 304275 |
| D 212 | diode 1N 4148 | 301254 | U 314 | IC HAF 0019 | 339673 |
| D 213 | break down diode ZPD 3V3 | 301275 | U 315 | IC RC 4558 P | 304275 |
| D 301 | diode 1N 4148 | 301254 | U 316 | IC TL 072 CP | 331340 |
| D 302 | diode 1N 4148 | 301254 | U 317 | IC TL 072 CP | 331340 |
| D 303 | break down diode ZPD 3V3 | 301275 | U 318 | IC HAF 0019 | 339673 |
| D 304 | diode 1N 4148 | 301254 | U 319 | IC HAF 0019 | 339673 |
| E 301 | relay V23042-A2003-B201 | 339682 | U 320 | IC RC 4558 P | 304275 |
| E 302 | relay V23042-A2003-B201 | 339682 | U 321 | IC RC 4558 P | 304275 |
| E 303 | relay V23042-A2003-B201 | 339682 | U 322 | IC LC 7537 N | 344867 |
| H 301 | res.network RKL 8A 103J | 343457 | U 323 | IC TL 072 CP | 331340 |
| H 302 | res.network RKL 8A 103J | 343457 | U 324 | IC TL 072 CP | 331340 |
| H 303 | res.network RKL 8A 103J | 343457 | U 325 | IC NJM 4556 D | 344864 |
| H 304 | res.network RKL 8A 103J | 343457 | U 326 | IC NJM 4556 D | 344864 |
| H 305 | res.network RKL 8A 103J | 343457 | U 327 | IC MC 79 L 05 ACP | 309721 |
| L 207 | coil | 339139 | U 328 | IC MC 74 HC 74 N | 339704 |
| L 301 | coil 47 UH/5.5A | 333717 | U 329 | IC MC 74 HC 00 N | 331920 |
| L 302 | coil | 339139 | U 330 | IC MC 78 L 05 ACP | 346343 |
| L 303 | coil | 339139 | X 201 | quarz 12.00 MHZ | 341638 |
| L 304 | coil | 339139 | X 301 | quarz 45.0000MHZ | 346313 |
| L 305 | coil | 339139 | 00030 | IC socket 28 pol | 332354 |
| L 306 | coil | 339139 | 00010 | socket 6pol. | 339842 |
| L 307 | coil | 339139 | | | |
| L 308 | coil | 339139 | 00020 | PCB DRP10/DRP 15 | 852168 |
| L 309 | coil | 339139 | B 401 | connector | 338835 |
| L 310 | coil | 339139 | C 401 | safety component 0.22MF | 344934 |
| Q 201 | trans. BC 560 B | 306928 | C 402 | safety component 0.22MF | 344934 |
| Q 202 | trans. BC 550 B | 301184 | C 403 | safety component 2.2NF | 334682 |
| Q 301 | trans. BC 337-25 | 307150 | C 404 | safety component 2.2NF | 334682 |
| R 302 | trim. pot. 100k lin | 338893 | L 401 | coil 2x 10 MH | 332961 |
| R 375 | trim. pot. 4.70 KOHM LIN | 334489 | S 401 | mains switch | 331175 |
| R 378 | trim. pot. 4.70 KOHM LIN | 334489 | D 107 | LED red | 345450 |
| S 201 | sliding switch | 338886 | D 110 | LED red | 345450 |
| U 201 | IC SAB 80535 N | 341631 | D 111 | LED 7xgn+3xrt | 344868 |
| U 202 | IC SN 74 HC573 N | 341636 | R 104 | potentiometer 2x5kohm log | 345484 |

| Pos. in diagram | | Part-No. | Pos. in diagram | | Part-No. |
|-----------------|---------------|----------|-----------------|--|----------|
| description | | | description | | |
| S 101 | switch | 339674 | | | |
| S 103 | switch | 339674 | | | |
| S 104 | switch | 339674 | | | |
| S 106 | switch | 339674 | | | |
| S 107 | switch | 339674 | | | |
| S 108 | switch | 339674 | | | |
| S 109 | switch | 339674 | | | |
| S 110 | switch | 339674 | | | |
| U 101 | IC UAA 2022 P | 333487 | | | |
| U 102 | IC MC 14489 P | 344866 | | | |

WARRANTY (Limited)

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice at 600 Cecil Street, Buchanan, MI 49107 (616/695-6831) and/or Electro-Voice West, at 8294 Doe Avenue, Visalia, CA 93291 (209/651-7777). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Electro-Voice Electronics are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

Service and repair address for this product: Electro-Voice, Inc. 600 Cecil Street, Buchanan, Michigan 49107.

Specifications subject to change without notice.



Electro-Voice a MARK IV company

600 Cecil Street, Buchanan, Michigan 49107, Phone (616) 695-6831, Fax: 616-695-1304

8234 Doe Avenue, Visalia, California 93291, Phone (209) 651-7777, Fax: (209) 651-0164

Mark IV Audio Canada, Inc. 345 Herbert St., Gananoque, Ontario, Canada K7G 2V1; Phone (613)382-2141, Fax (613)382-7466