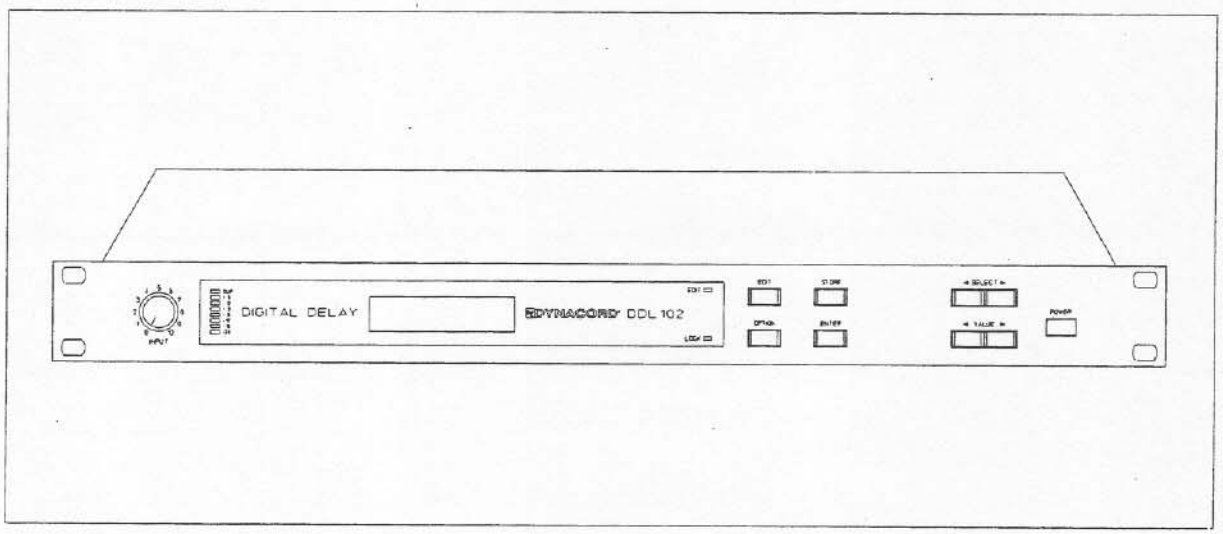
DYNACORD®

USER MANUAL



DDL 102

Digital Signal Delay Line

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.

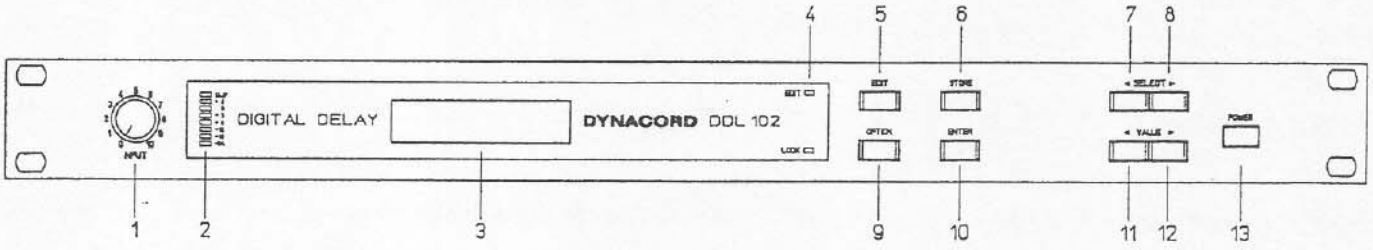
IMPORTANT NOTES

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!

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 <

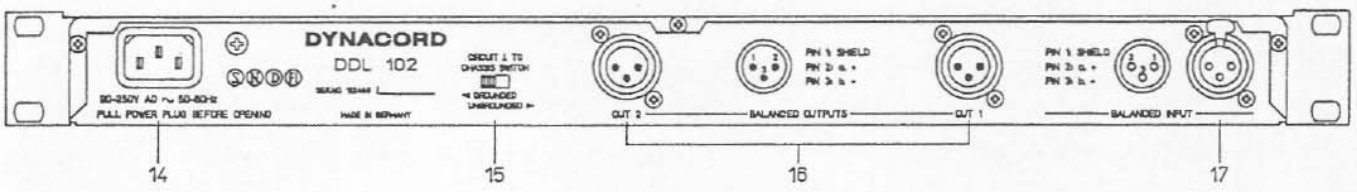
This key is used to decrease the value of the parameter displayed. If you keep the key pressed the parameter alteration is accelerated. The key is active in the EDIT and OPTION modes as well as on storing.

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 40C.

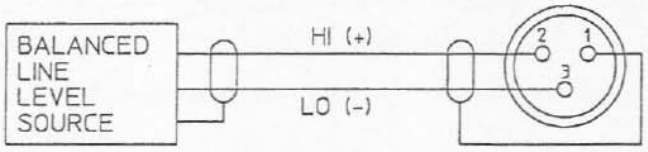
Before you switch on the DDL 102, all connections should be made according to your required configuration and wiring.

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.

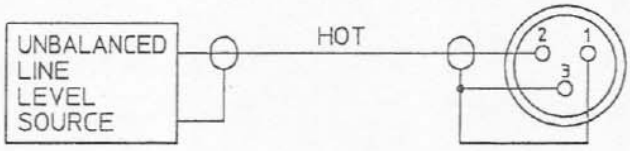
3.1 Balanced input wiring

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.



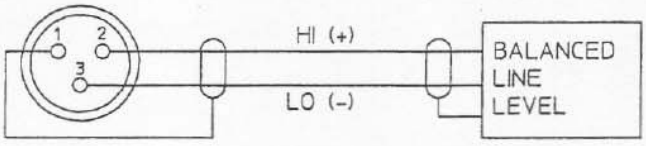
3.2 Unbalanced input wiring

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.



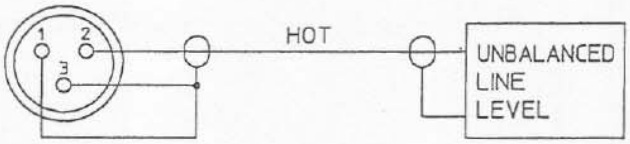
3.3 Balanced output wiring

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.

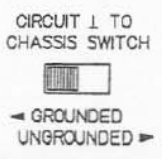


3.5 Position of the Groundlift switch

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

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

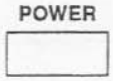
GROUNDED: If you are useing the DDL 102 together with other units in a 19" rack.



4. START-UP

4.1 SWITCHING THE UNIT ON

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



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.

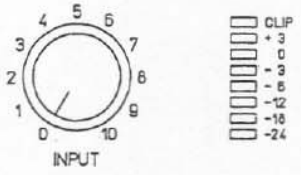
Service Required Chng. Int. Battery

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.

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 programms
Activation via STORE key

4. OPTION MODE:

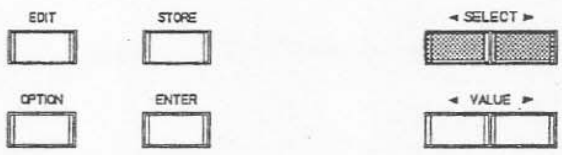
Editing functions pertaining to equipment
Switching the edit protection on and off
Activation via OPTION key

5.1 PROGRAM SELECTION

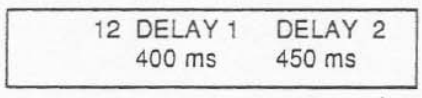
Programs can only be called up when the DDL 102 is in Play mode. This is the case after switching on, for example.

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

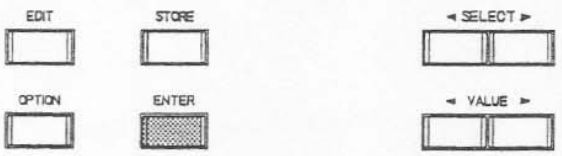
1 To call up a memory place you search for the program you want with the SELECT keys (7) and (8).



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



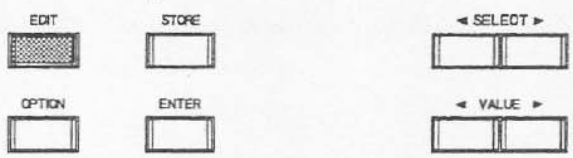
3 Activate the program by pressing the ENTER key (10). The program number stops blinking.



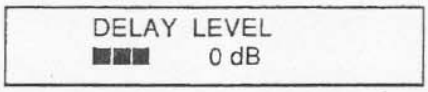
5.2 EDITING

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

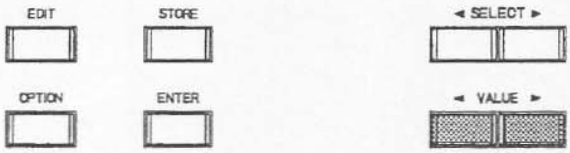
1 Press the EDIT key (5).



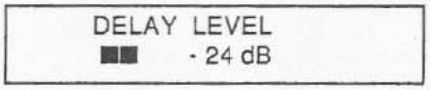
2 You are now in EDIT Mode. The EDIT LED lights up and the name and the value of the first parameter in the active program appear on the display. A graphic indication of the parameter value gives constant information as to one's current position in the parameter range.



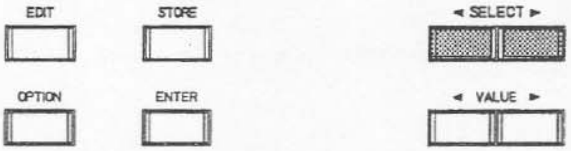
3 The VALUE keys (11, 12) can now be used to alter the parameter value. If one of these keys is kept pressed, the parameter alteration is accelerated.



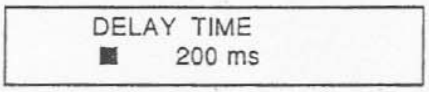
4 The set value appears on the display and the change is immediately audible. The EDIT LED then blinks to show that the program has been changed. If you do not wish to alter further parameters, proceed directly to point 7.



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



6 The following may appear on the display:

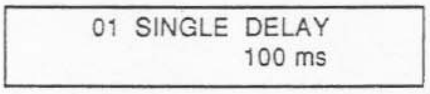


Points 3 to 6 can be repeated as often as required.

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

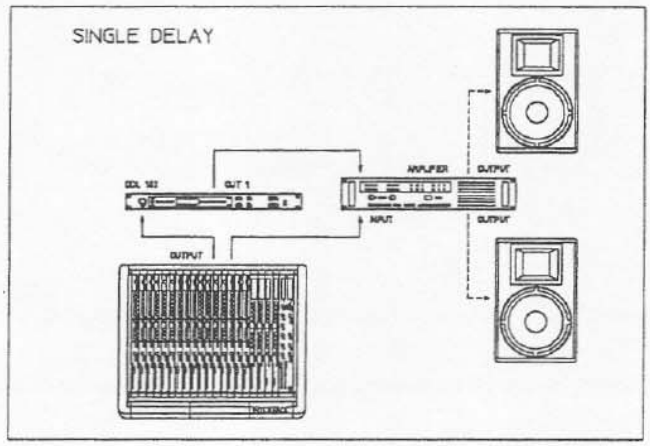
The DDL 102 has 2 different delay configurations or structures:

SINGLE DELAY

DELAY1 DELAY2

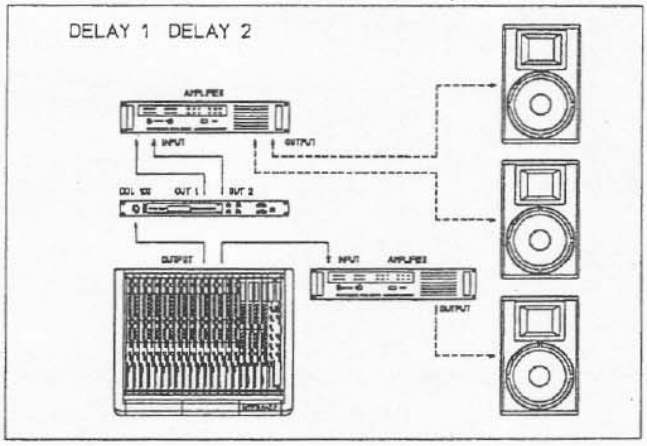
SINGLE DELAY is a delay line with one input and one output. This configuration can be used for situations where only one speaker group has to be delayed.

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.

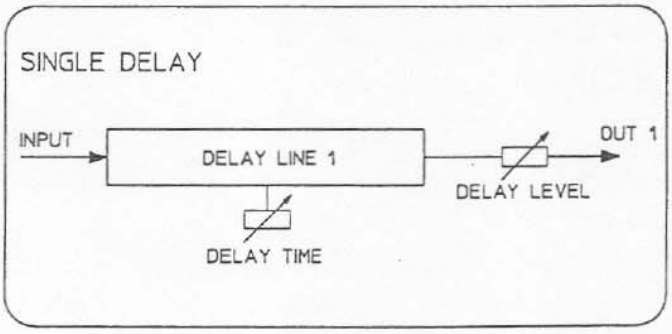
A typical DELAY1 DELAY2 set-up is shown in the fig. on the right.



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 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

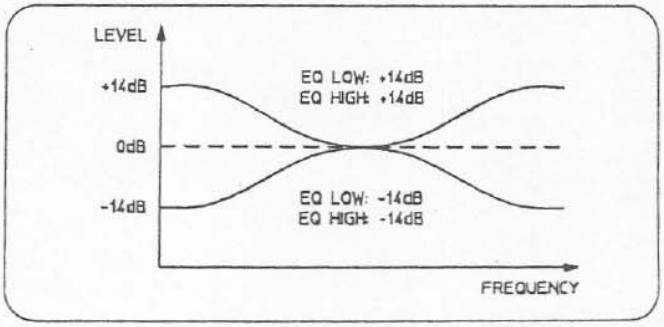
EQ LOW
■■ - 1 dB

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.

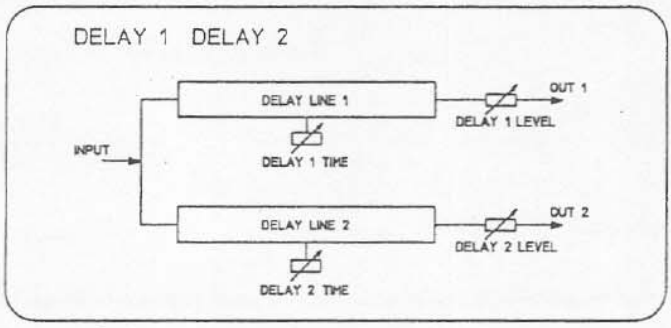
Settings: **Single Delay**
Delay 1 Delay 2

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 ars 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 TIME UNIT

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

Distance settings are automatically calculated into delay times.

DELAY TIME UNIT
milli - sec.

Settings: milli-sec.
feet
inch
meter
centimeter

EQ LOW

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

Valuation range: - 14dB - +14dB

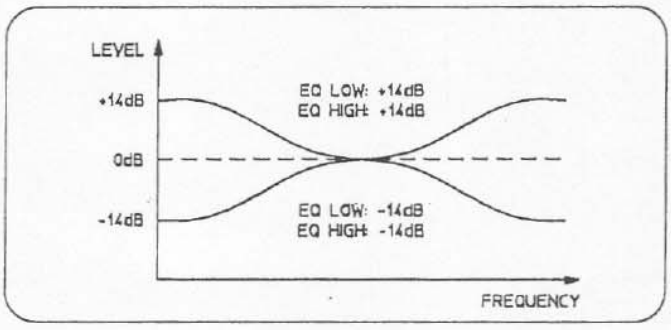
EQ LOW
■■ - 1 dB

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.

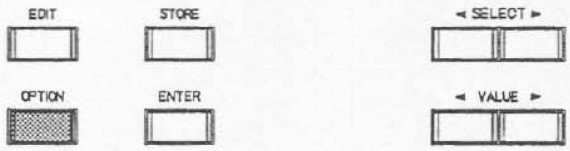
CONFIGURATION
Single Delay

Settings: **Single Delay**

Delay 1 Delay 2

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.:

```
LCD   CONTRAST
*** +3 ***
```

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).

```
LCD CONTRAST
***  +7  ***
```

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.

```
VU DISPLAY MODE
Peak hold
```

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

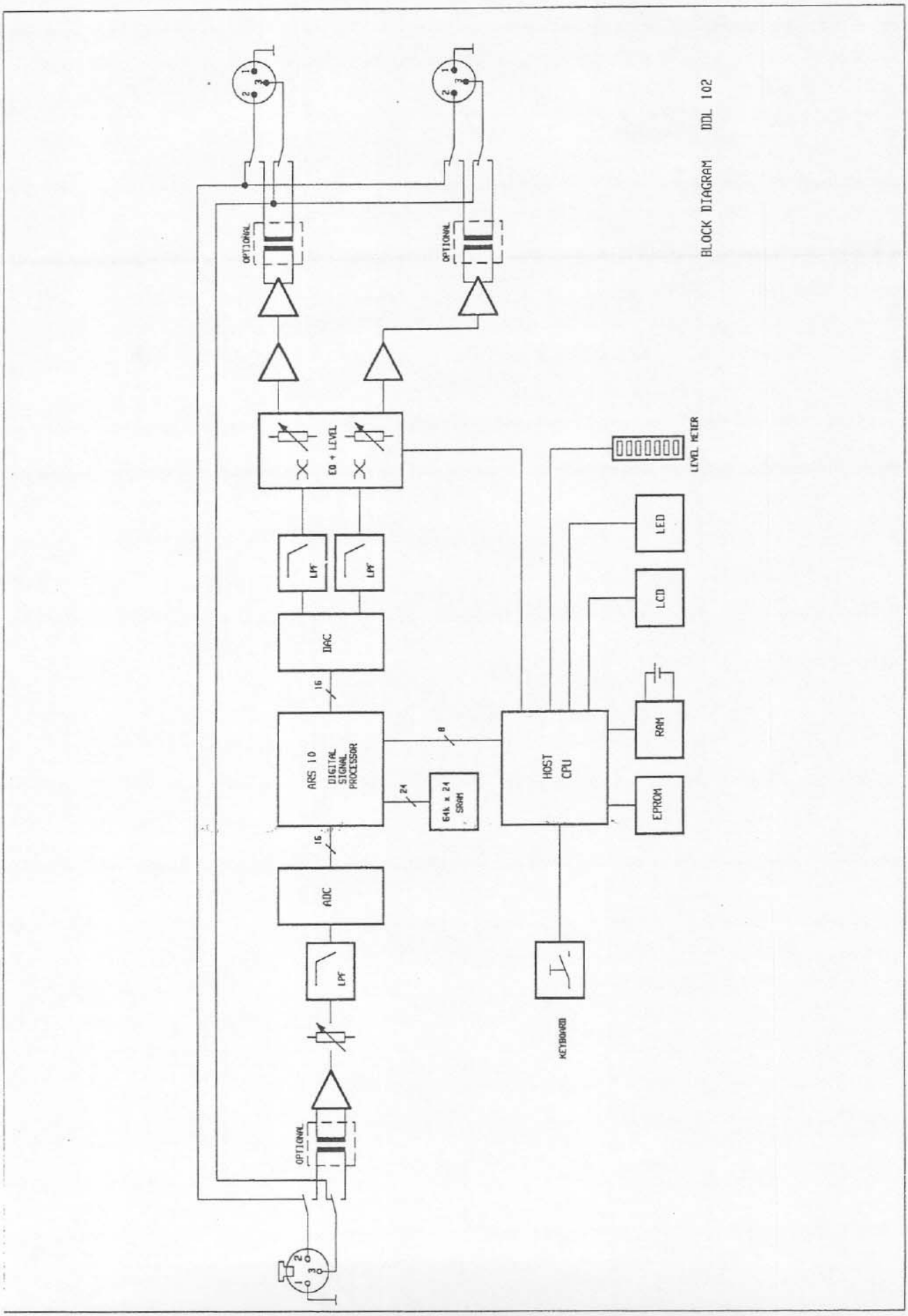
The display shows the software version of the DDL 102's signal processor, e.g. version 1.0.

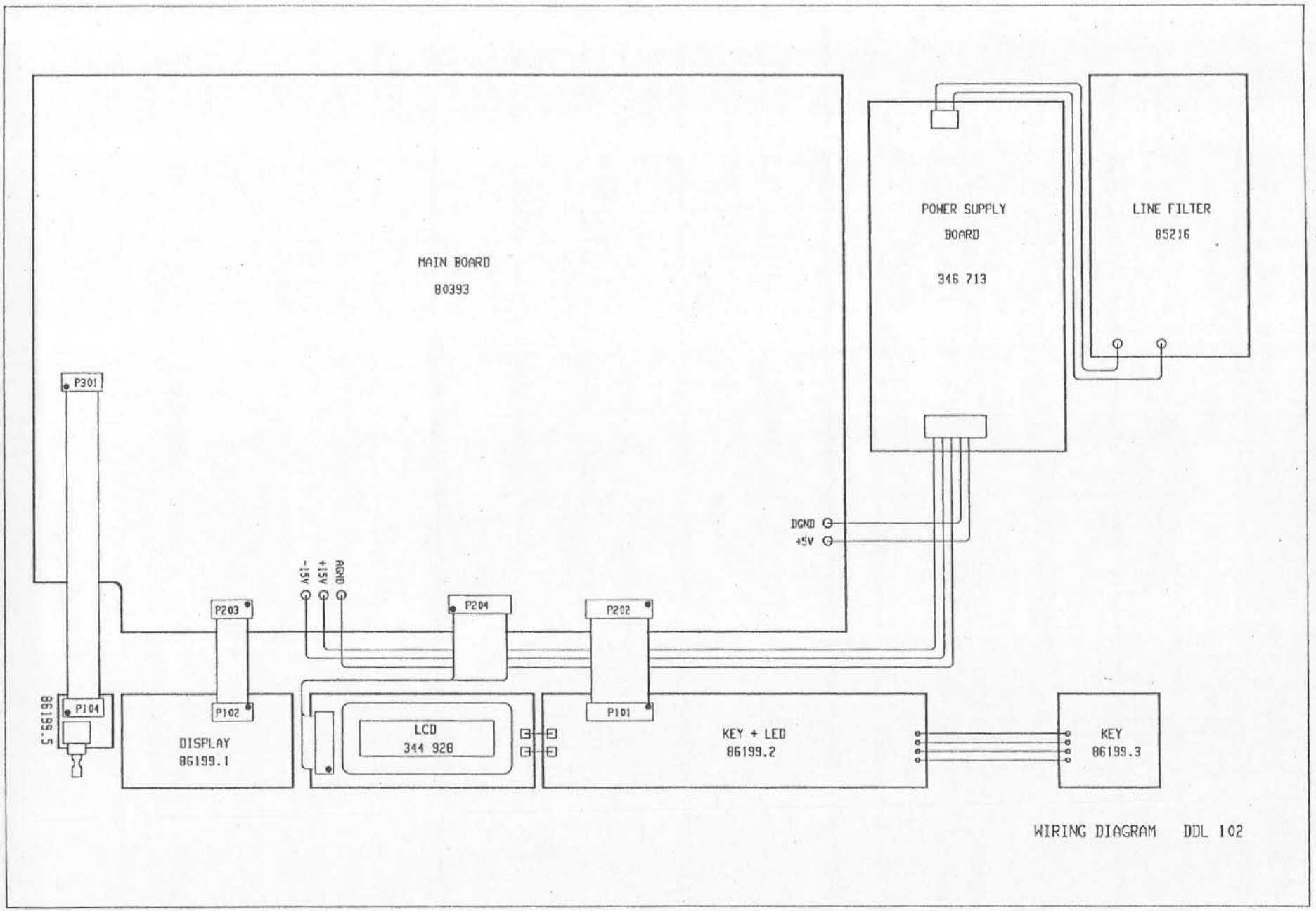
```
DYNACORD DDL 102
Software V 1.0
```

8.1 SPECIFICATIONS

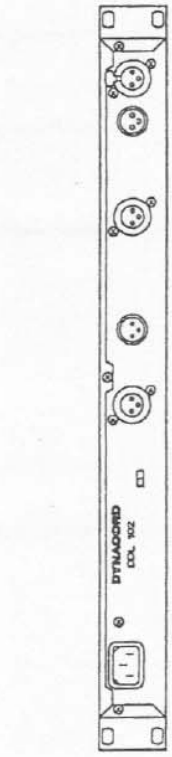
Mains voltage	90 - 250 VAC / 50 - 60 Hz (without switching)
Power consumption	max. 15 W
Safety class	I
Input voltage	1.23 V / +4 dBu
Max. input voltage	9 V / +21 dBu
CMRR	> 60 dB
Input impedance	10 kohms
Output voltage	1.23 V / +4 dBu (LEVEL = 0 dB)
Max. output voltage	8.7 V / +21 dBu
Output impedance	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
Retrifitting kits	NRS 90 185 (1 x input transformer) NRS 90 186 (1 x output transformer)

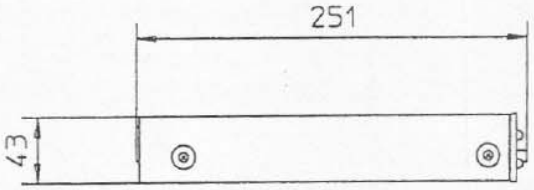
The specifications for this product are subject to change without prior notice.

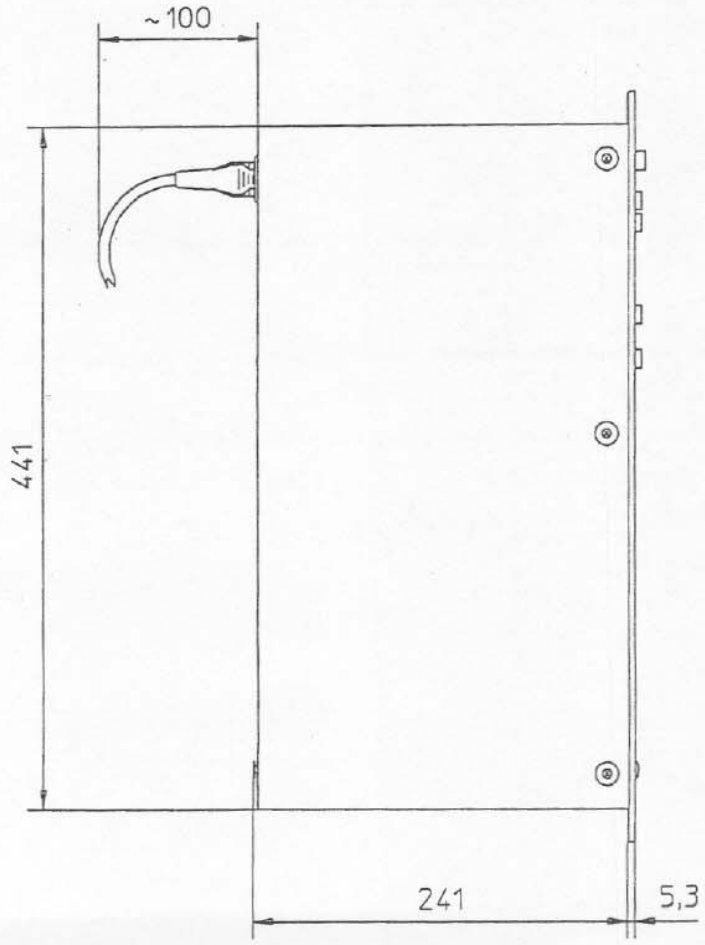

BLOCK DIAGRAM DDL 102
OPTIONAL
OPTIONAL
OPTIONAL
EQ + LEVEL
LPF
LPF
DAC
16
ARS 10
DIGITAL
SIGNAL
PROCESSOR
8
24
64k x 24
SRAM
16
ADC
LPF
HOST
CPU
LEVEL METER
LED
LCD
RAM
EPROM
KEYBOARD


MAIN BOARD
80393
POWER SUPPLY
BOARD
346 713
LINE FILTER
85216
P301
DGND
+5V
-15V
+15V
AGND
P203
P204
P202
P104
P102
P101
86199.5
DISPLAY
86199.1
LCD
344 928
KEY + LED
86199.2
KEY
86199.3
WIRING DIAGRAM DDL 102

ABMESSUNGEN (in mm)
DIMENSIONS (in mm)







SERVICE

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 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_{Imax}	=	8.7 V
		=	+21 dBu
4.3 Common Mode Rejection Ratio (CMRR)			
- f = 1 kHz			
- without transformer			60 dB
- with transformer			45 dB

5. Outputs

5.1. Output impedance	Zo	=	100 ohms
5.2. Output voltage			
- measured at 100 kohms load impedance			
- without transformer	Eo	=	1.3 V
		=	+4.5 dBu
- with transformer	Eo	=	1.15 V
		=	+3.5 dBu
- measured at 600 ohms load impedance			
- without transformer	Eo	=	1.2 V
		=	+3.8 dBu
- with transformer	Eo	=	0.9 V
		=	+1.5 dBu
- max. output voltage	E_{Imax}	=	8.7 V
- measured at 100 kohms load impedance			
- without transformer	Eo	=	8.7 V
		=	+21 dBu
- with transformer	Eo	=	8.7 V
		=	+21 dBu
- measured at 600 ohms load impedance			
- without transformer	Eo	=	8.2 V
		=	+20.5 dBu
- with transformer	Eo	=	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

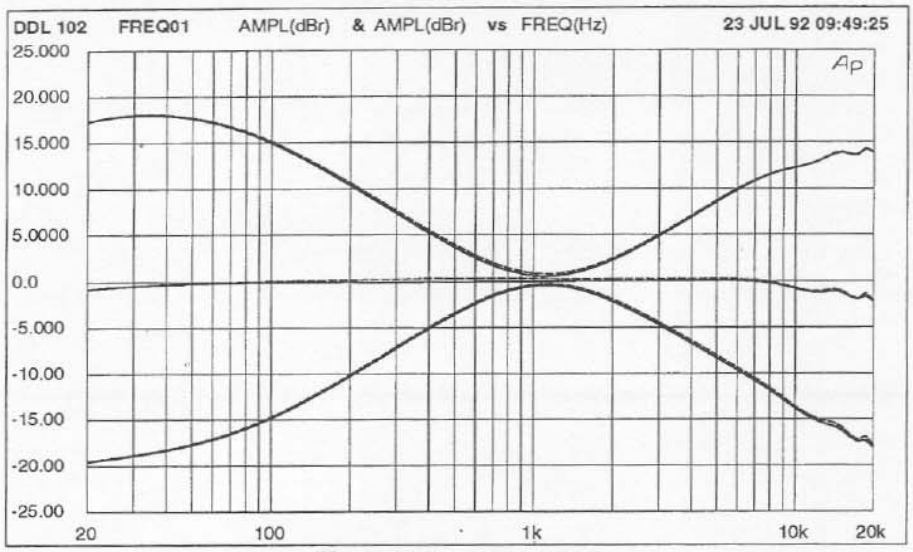
NOTE! Before carrying out the distortion factor measurement the unit must be allowed to warm-up for a duration of 5 minutes and then the converter must be adjusted to minimum distortion (THD) with the test program "MSB ADJUST".

5.5 Noise voltages

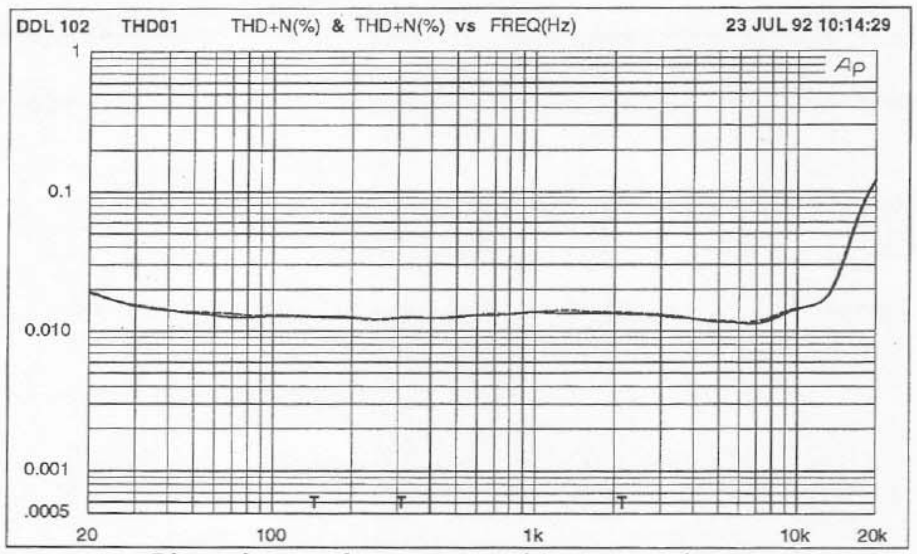
Noise voltage (quasi peak level)	=	480 V
	=	-84 dB
CCIR 468 (quasi peak level)	=	1 mV
	=	-77 dB
dB(A) (r.m.s.)	=	220 µV
	=	-90 dB

6. Specifications

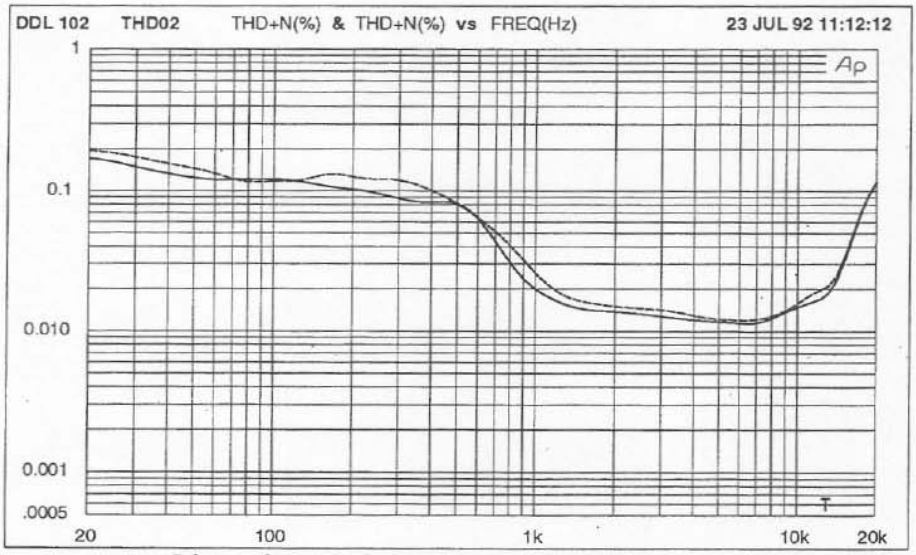
Mains voltage	90 - 250 VAC / 50 - 60 Hz (without switching- over)
Power consumption	max. 15 W
Safety class	I
Input voltage	1.23 V / +4 dBu
Max. input voltage	8.7 V / +21 dBu
CMRR	60 dB
Input impedance	10 kohms
Output voltage	1.3 V /+4.5 dB
Max. output voltage	8.7 V /+21 dB
Output impedance	100 ohms
Min. 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



Frequency response



Distortion vs. frequency - without transformer



Distortion vs. frequency - with transformer

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

Pressing the keys "EDIT" and "OIPTION" 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 µP-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.

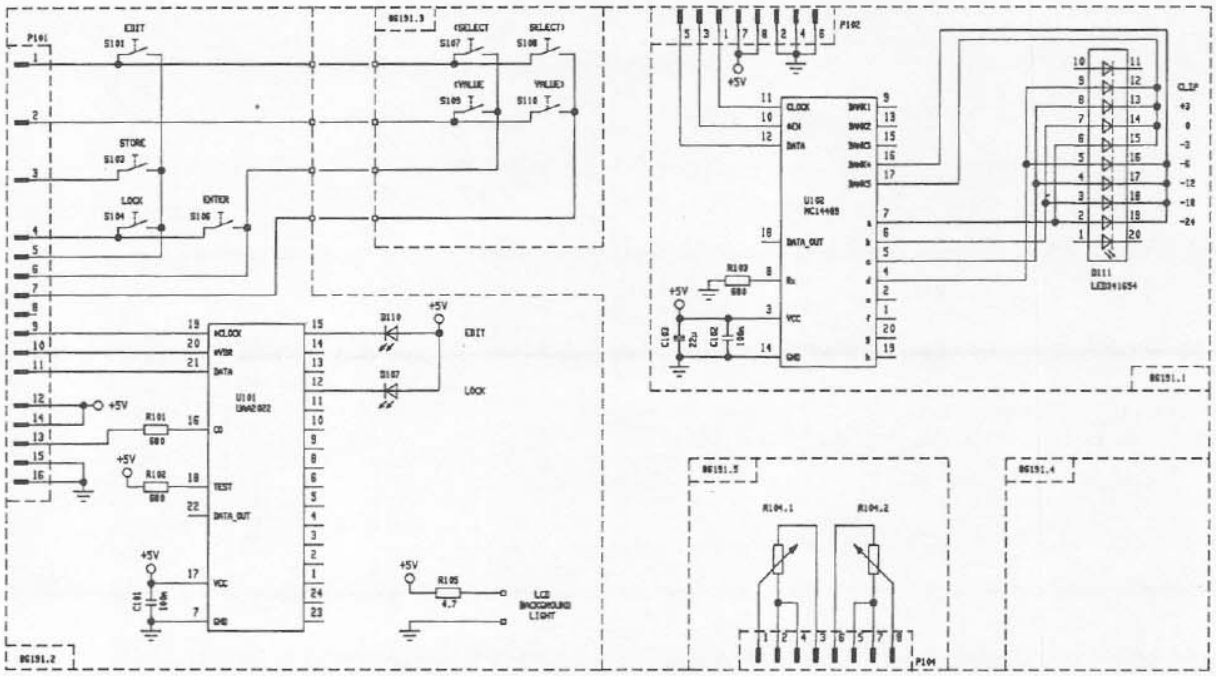
NOTE! All alterations in the delay programs will be lost during this test. All program parameters are reset to the factory default values!

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

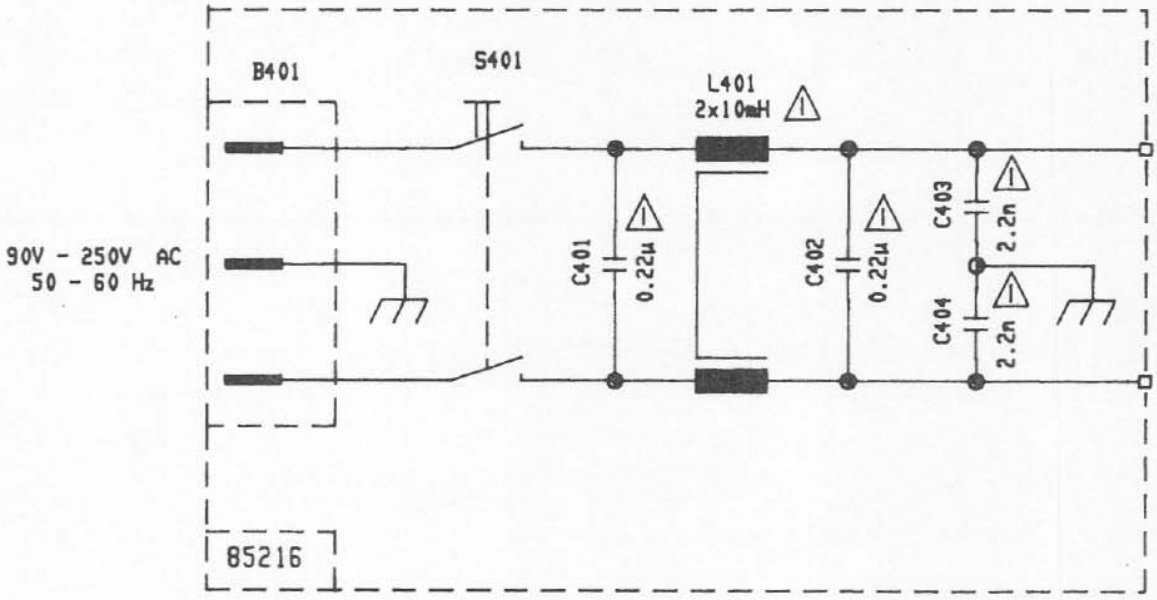
Warning: Data in
RAM will be lost

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

Testing µP-RAM
...

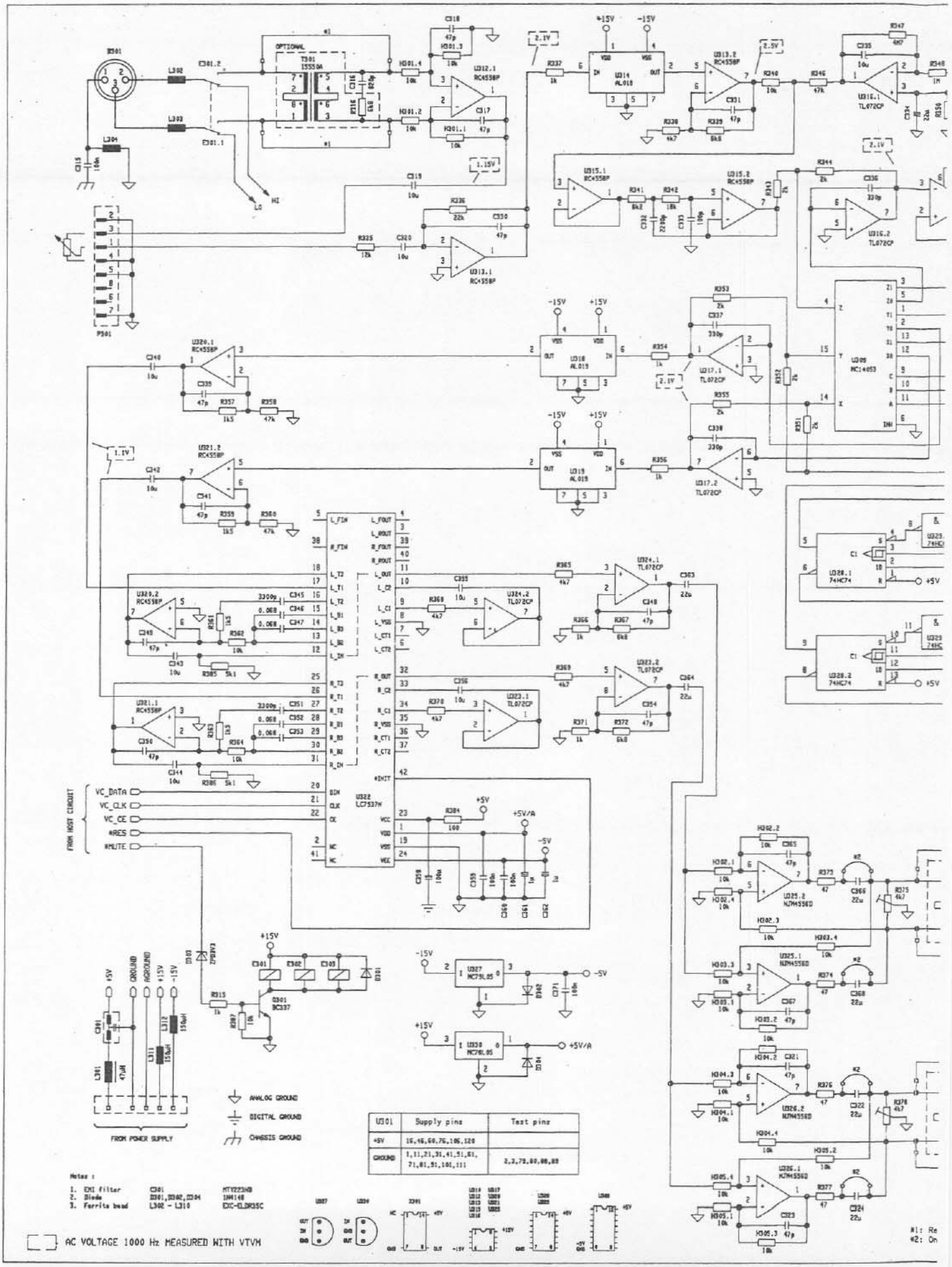


FRONT BOARD 86199	
CIRCUIT DIAGRAM	
346 601	3-
DDL 102	



⚠ SAFETY COMPONENT
(MUST BE REPLACED BY ORIGINAL PART)

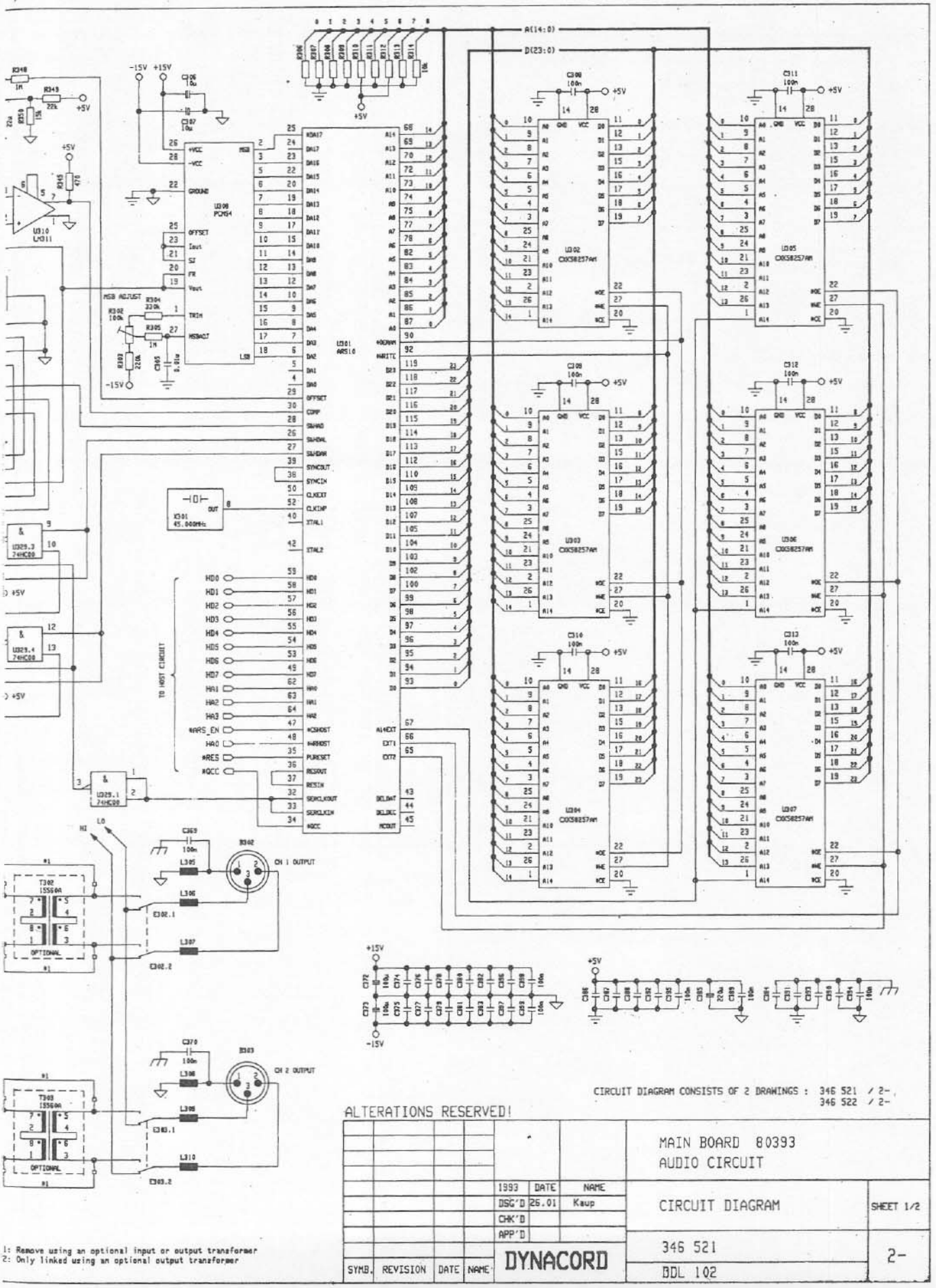
LINE FILTER 85216	
CIRCUIT DIAGRAM	
344 859	4-

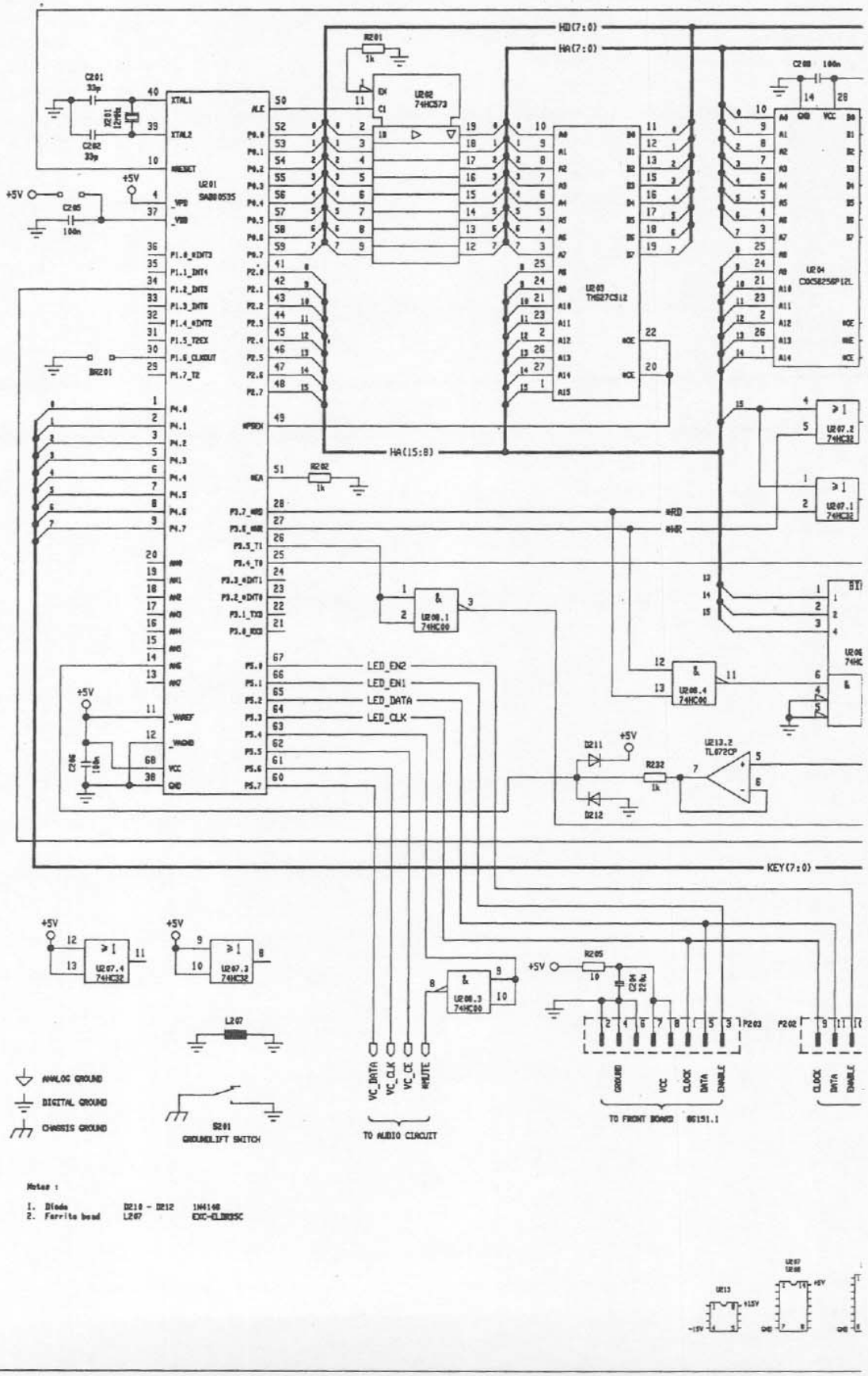


U301	Supply pins	Test pins
+5V	16,46,60,76,106,120	
GROUND	1,11,21,31,41,51,61, 71,81,91,101,111	2,3,78,80,86,88

Notes :

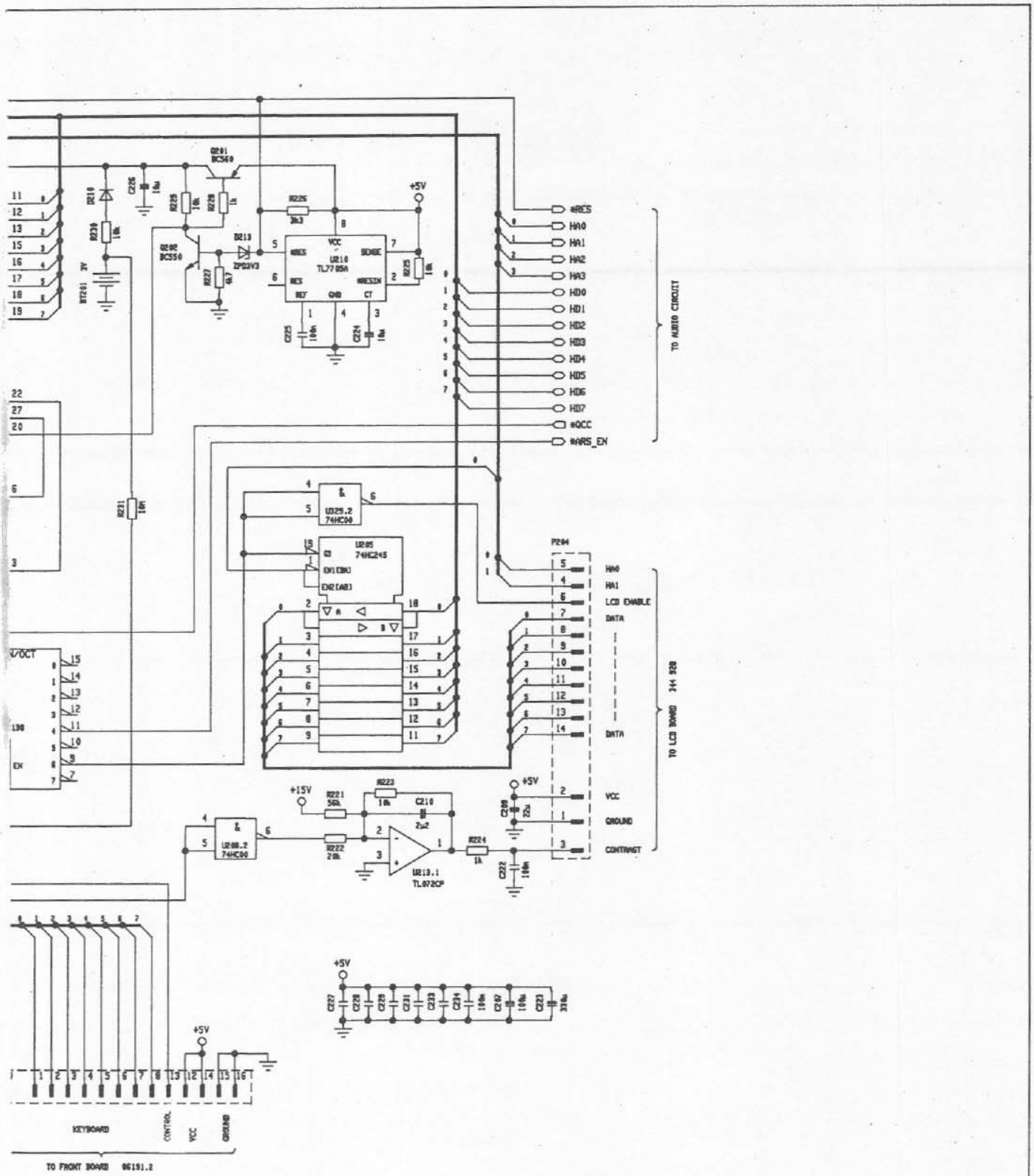
1. EMI filter — C301 — MTY223NB
2. Diode — D301,D302,D304 — 1N4148
3. Ferrite bead — L302 - L310 — EXC-ELDR35C


A(14:0)
D(23:0)
CIRCUIT DIAGRAM CONSISTS OF 2 DRAWINGS : 346 521 / 2-
346 522 / 2-
ALTERATIONS RESERVED!
MAIN BOARD 80393
AUDIO CIRCUIT
CIRCUIT DIAGRAM
SHEET 1/2
346 521
2-
BDL 102
DYNACORD
1993 DATE NAME
DSG'D 26.01 Kaup
CHK'D
APP'D
SYMB. REVISION DATE NAME
1: Remove using an optional input or output transformer
2: Only linked using an optional output transformer



Notes :

1. Diode D210 - D212 1N4148
2. Ferrite bead L207 EXC-CL3035C



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

ALTERATIONS RESERVED!

SYMB.	REVISION	DATE	NAME

1993	DATE	NAME
DSG'D	26.01	Kaup
CHK'D		
APP'D		

DYNACORD

MAIN BOARD 80393
HOST CIRCUIT

CIRCUIT DIAGRAM — SHEET 2/2

346 522 — 2-

DDL 102

Pos. in diagram	description	Part-No.
00010	plexiglas panel DDL 102 EV	348067
00040	push button black 12,5x7	337059
00050	push button black 6,4x 13,4	342496
00060	rotary knob black 16	342120
00080	power supply	346713
00090	display	344928
00010	PCB DDL 102	803938
B 301	XLR socket 3 pol.	341945
B 302	XLR connector 3 pol.	341944
B 303	XLR connector 3 pol.	341944
BT201	battery	341655
C 204	KO-EL 220 MF 25V	343533
C 301	safety component	343489
C 361	KO-EL 1 MF 50V	340520
C 362	KO-EL 1 MF 50V	340520
C 385	KO-EL 220 MF 25V	343533
D 210	diode 1N 4148	301254
D 211	diode 1N 4148	301254
D 212	diode 1N 4148	301254
D 213	break down diode ZPD 3V3	301275
D 301	diode 1N 4148	301254
D 302	diode 1N 4148	301254
D 303	break down diode ZPD 3V3	301275
D 304	diode 1N 4148	301254
E 301	relay V23042-A2003-B201	339682
E 302	relay V23042-A2003-B201	339682
E 303	relay V23042-A2003-B201	339682
H 301	res.network RKL 8A 103J	343457
H 302	res.network RKL 8A 103J	343457
H 303	res.network RKL 8A 103J	343457
H 304	res.network RKL 8A 103J	343457
H 305	res.network RKL 8A 103J	343457
L 207	coil	339139
L 301	coil 47 UH/5.5A	333717
L 302	coil	339139
L 303	coil	339139
L 304	coil	339139
L 305	coil	339139
L 306	coil	339139
L 307	coil	339139
L 308	coil	339139
L 309	coil	339139
L 310	coil	339139
Q 201	trans. BC 560 B	306928
Q 202	trans. BC 550 B	301184
Q 301	trans. BC 337-25	307150
R 302	trim. pot. 100k lin	338893
R 375	trim. pot. 4.70 KOHM LIN	334489
R 378	trim. pot. 4.70 KOHM LIN	334489
S 201	sliding switch	338886
U 201	IC SAB 80535.N	341631
U 202	IC SN 74 HC573 N	341636

Pos. in diagram	description	Part-No.
U 204	IC CXK 58256 P-12L	339671
U 205	IC SN 74 HC245 N	338389
U 206	IC MC 74 HC138 N	339705
U 207	IC MC 74 HC 32 N	331929
U 208	IC MC 74 HC 00 N	331920
U 210	IC TL 7705	335857
U 213	IC TL 072 CP	331340
U 301	IC MB 635213	344923
U 302	IC CXK 58257	344927
U 303	IC CXK 58257	344927
U 304	IC CXK 58257	344927
U 305	IC CXK 58257	344927
U 306	IC CXK 58257	344927
U 307	IC CXK 58257	344927
U 308	IC PCM 54 HP	339670
U 309	IC MC 14053 BCP	335501
U 310	IC LM 311	330767
U 312	IC RC 4558 P	304275
U 313	IC RC 4558 P	304275
U 314	IC HAF 0019	339673
U 315	IC RC 4558 P	304275
U 316	IC TL 072 CP	331340
U 317	IC TL 072 CP	331340
U 318	IC HAF 0019	339673
U 319	IC HAF 0019	339673
U 320	IC RC 4558 P	304275
U 321	IC RC 4558 P	304275
U 322	IC LC 7537 N	344867
U 323	IC TL 072 CP	331340
U 324	IC TL 072 CP	331340
U 325	IC NJM 4556 D	344864
U 326	IC NJM 4556 D	344864
U 327	IC MC 79 L 05 ACP	309721
U 328	IC MC 74 HC 74 N	339704
U 329	IC MC 74 HC 00 N	331920
U 330	IC MC 78 L 05 ACP	346343
X 201	quarz 12.00 MHZ	341638
X 301	quarz 45.0000MHZ	346313
00030	IC socket 28 pol	332354
00010	socket 6pol.	339842
00020	PCB DRP10/DRP 15	852168
B 401	connector	338835
C 401	safety component 0,22MF	344934
C 402	safety component 0,22MF	344934
C 403	safety component 2.2NF	334682
C 404	safety component 2.2NF	334682
L 401	coil 2x 10 MH	332961
S 401	mains switch	331175
D 107	LED red	345450
D 110	LED red	345450
D 111	LED 7xgn+3xrt	344868
R 104	potentiometer 2x5kohm log	345484

Pos. in diagram description	Part-No.	Pos. in diagram description	Part-No.
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

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