
STUDER D741

Professional CD Recorder

Service Information

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Technical Documentation
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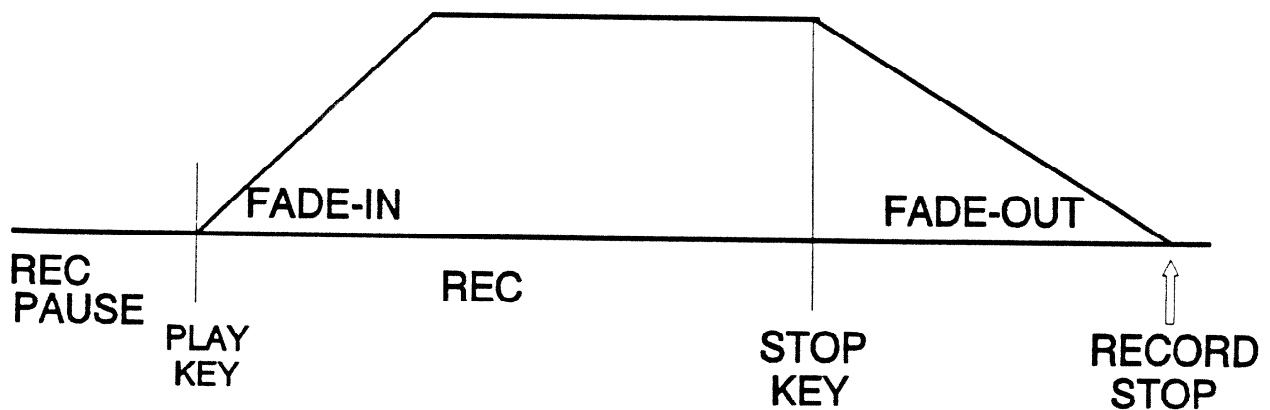
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PRESET DIGITAL FADE IN / OUT

AUTOMATIC AUDIO FADING AT BEGIN AND END
OF A MUSIC TRACK

- * ADJUSTABLE FADE - IN TIME : 1-10 SEC
- * ADJUSTABLE FADE - OUT TIME : 1 - 10 SEC

FADE IN / OUT : AUDITIVE LINEAR CURVES



display indicates "BUFFER"

PRESET CASCADE

- * DIRECT LOOP THROUGH OF DIG. INPUT TO OUTPUT

CAS OFF :

DURING RECORD / RECORD.STANDBY :

ANALOGUE INPUT:

- AES/EBU AND SPDIF DIGITAL OUTPUTS
SPDIF : SUBCODE GENERAL
AES/EBU : SUBCODE "CD"

SPDIF DIGITAL INPUT:

- SPDIF DIG. OUT DIRECT LOOP THROUGH OF
SPDIF DIGITAL INPUT
- AES/EBU DIGITAL OUTPUT FORMAT
CONVERTED + SRC

AES/EBU DIGITAL INPUT :

- SPDIF DIG. OUT FORMAT CONVERTED + SRC
- AES/EBU DIG. OUT + SRC

CAS ON :

DURING RECORD / RECORD.STANDBY :

ANALOGUE INPUT:

- SPDIF DIGITAL OUTPUT (SUBCODE GENERAL)
AES/EBU INPUT DIRECT TO AES/EBU OUTPUT

SPDIF DIGITAL INPUT:

- SPDIF DIG. OUT DIRECT LOOP THROUGH OF
SPDIF DIGITAL INPUT
- AES/EBU INPUT DIRECT TO AES/EBU OUTPUT

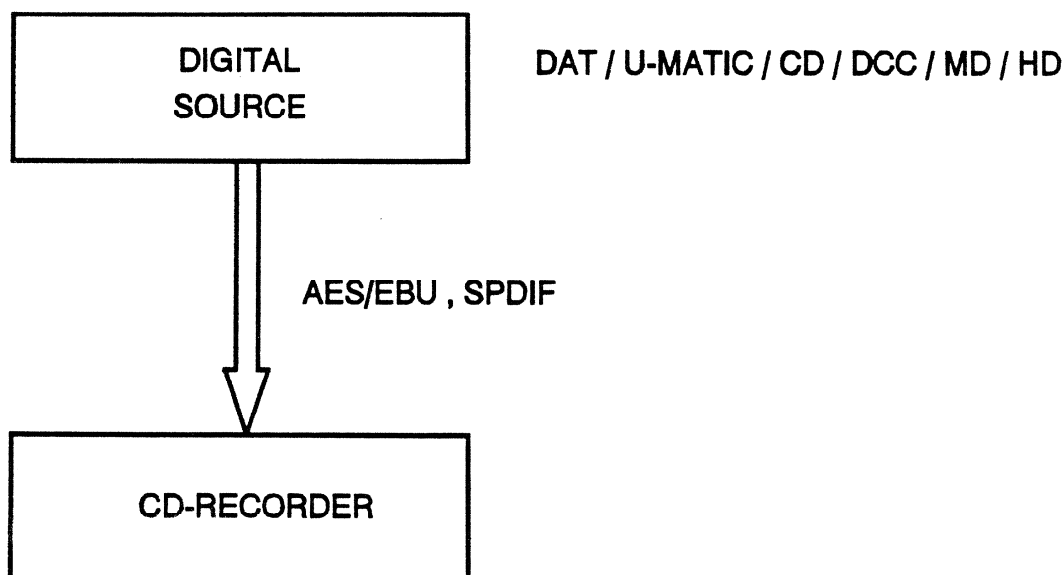
AES/EBU DIGITAL INPUT :

- SPDIF DIG. OUT FORMAT CONVERTED
- AES/EBU DIG. OUT DIRECT LOOP THROUGH
OF AES/EBU DIG. INPUT

AES/EBU DIRECT IN/OUT ALSO IN STOP/PLAY MODE !

SAMPLE RATE CONVERSION

- * CONVERTS 32 - 58 kHz SAMPLING RATES OF THE DIGITAL INPUT SOURCE TO 44.1 kHz
- * BEST QUALITY SRC AVAILABLE
- * AUTOMATIC SWITCHING TO HIGH PRECISION MODE ON 44.1 kHz INPUT SOURCE
- * AUTOMATIC DE - JITTERING

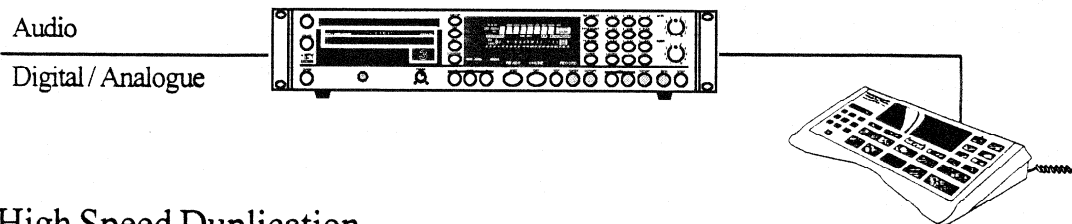


- * SRC OFF : WHEN INPUT IS OUT OF RANGE:
SRC WILL BE SWITCHED ON AUTOMATICALLY
LOCK RANGE = 44.1 kHz +/- 150 ppm
- * IN MONITOR MODE THE AES/EBU DIGITAL
OUTPUT = 44.1 kHz / 20 BIT RESOLUTION
IN CASE OF RECORDING → NOISE SHAPING FROM
20BIT TO 16BIT

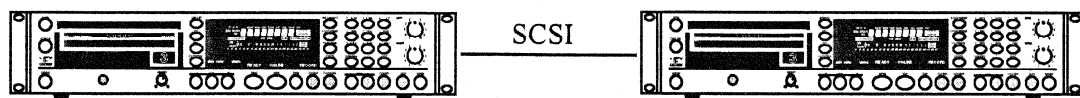


D741 OPERATION MODES

1) Audio Stand Alone



2) High Speed Duplication



Formats:

CDR-DA

CDR-ROM mode1

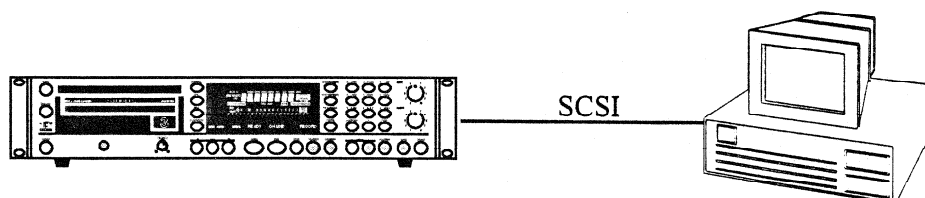
CDR-ROM mode2/form1

CD-DA

CD-ROM mode1 (only track 1)

CD-ROM mode2/form1 (only track 1)

3) PC- Source & Control



FORMATS: CD-DA, CD-I, CD-ROM(XA), V-CD

PRESET

DEFAULT RECORDER SETTINGS

TOGGLE THROUGH PRESET OPTIONS

- * INCREMENT SELECT
MANUAL OR AUTOMATIC TRACK INCREMENT
- * AUTO - 1: ON / OFF
- * AUDIO DELAY TIME
0 - 4 SECONDS / 5 FRAME STEPS
- * AUTO TRACK LEVEL
-70 TO -30 dB / 5 dB STEPS
- * INPUT SENSITIVITY : +4 dBu / -10 dBu
- * REC MUTE TIME : 2 - 5 SEC / 0.5 SEC STEPS
- * DIGITAL FADE IN : ON / OFF
- * FADE IN TIME : 1 - 10 SEC / 1 SEC STEPS
- * DIGIAL FADE OUT : ON / OFF
- * FADE OUT TIME : 1 - 10 SEC / 1 SEC STEPS
- * CASCADE : ON / OFF
- * SCSI : SCSI MODE ON / OFF

NEXT / PREVIOUS : TO CHANGE PRESET VALUES

STOP : TO STORE THE PRESETS

PRESET INCREMENT SELECT

TRACK INCREMENT DURING RECORDING :

- * MANUAL**
- * AUTOMATIC :**
 - ANALOGUE INPUT : ON INPUT LEVEL**
 - DIGITAL INPUT: ON SUBCODE**
 - * CD**
 - * DAT**
 - * DCC**
 - * MD**

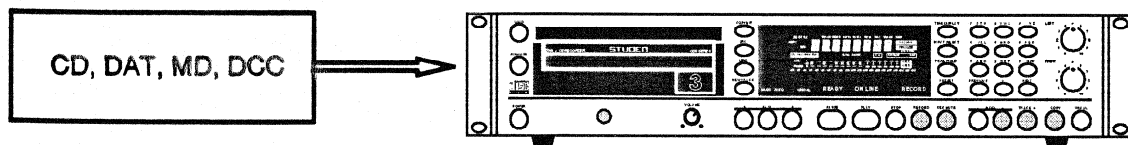
ACCURACY: +/- 3 FRAMES

**NO DIGITAL SUBCODE AVAILABLE :
AUTO TRACK INCREMENT ON MUSIC LEVEL**

INDEX INCREMENT DURING RECORDING :

- * POSSIBLE MANUALLY**
- * AUTOMATIC VIA DIGITAL INPUT WITH CD SOURCE
(EXCEPT INDEX 0)**

PRESET AUTO - 1



**AUTOMATIC START OF RECORDING FROM SOURCE
CONNECTED TO THE DIGITAL INPUT**

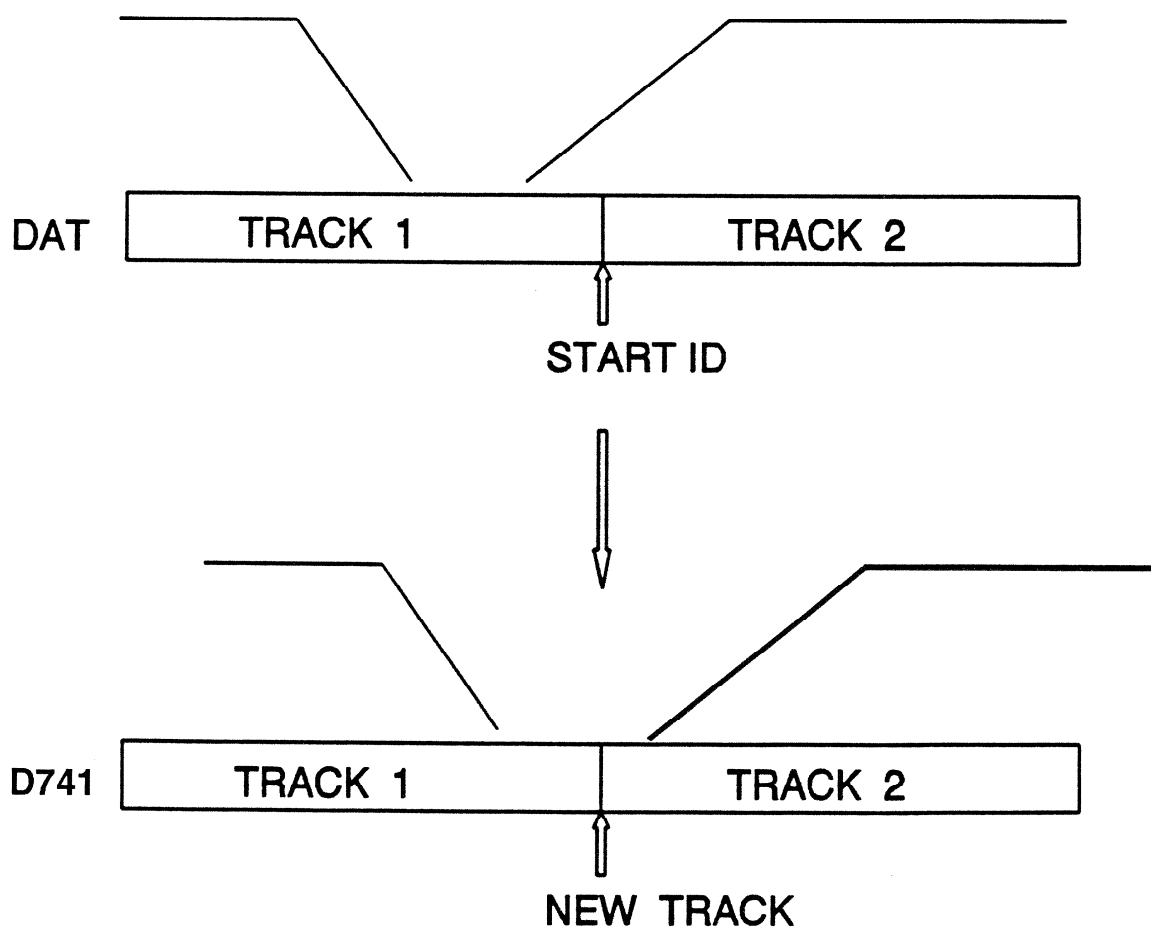
- SWITCH PRESET TO DIGITAL INPUT
 - SWITCH PRESET TO AUTO - 1 ON
(PRESET INCREMENT SELECT WILL SWITCH
TO AUTO)
 - PRESS REC FOR RECORD - STANDBY
 - CD AND MD SOURCE :
START THE CD/MD PLAYER FROM STOP MODE
(NOT FROM PAUSE MODE)
RECORDING WILL START ON FIRST INCOMING
SUBCODE
 - DAT AND DCC SOURCE :
START THE DAT/DCC RECORDER BEFORE
THE FIRST START - ID
RECORDING WILL START ON FIRST INCOMING ID
- * RECORDING WILL STOP AFTER 6 SEC NO SUBCODE
0 IN CASE OF LEAD OUT**

PRESET AUDIO DELAY TIME

COMPENSATION FOR TRACK NUMBER TRANSITIONS
AUDIO DELAY WITH RESPECT TO SUBCODE

- * ADJUSTABLE 0 - 4 SEC IN STEPS OF 5 FRAMES
5 FRAMES = 66 msec

EXAMPLE :



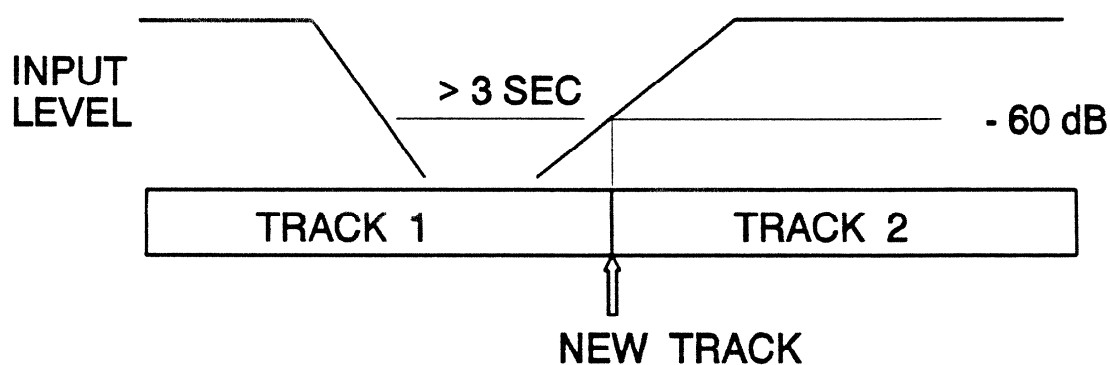
PRESET AUTO TRACK LEVEL

AUTOMATIC TRACK INCREMENT ON MUSIC LEVEL

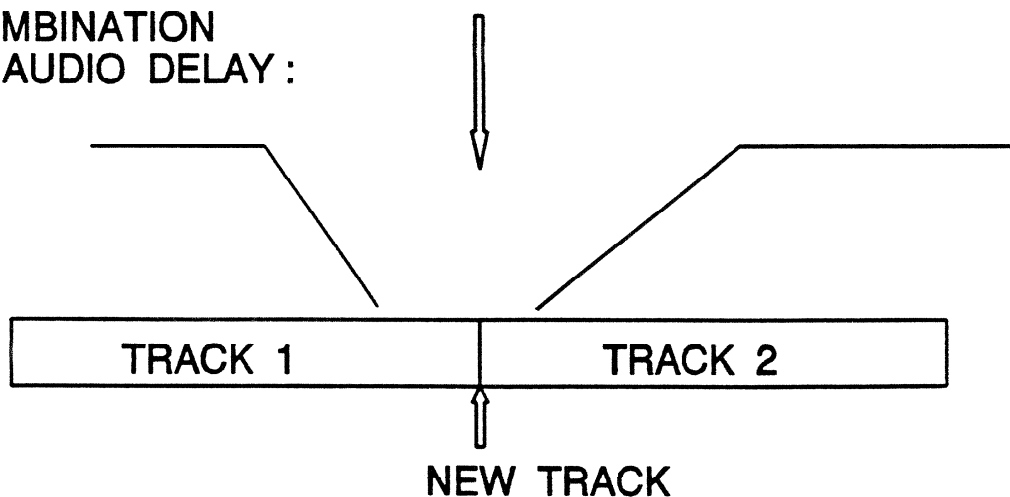
* OF ANALOGUE INPUT

ADJUSTABLE : -30 TO -70 dB IN 5 dB STEPS

EXAMPLE :



IN COMBINATION
WITH AUDIO DELAY :

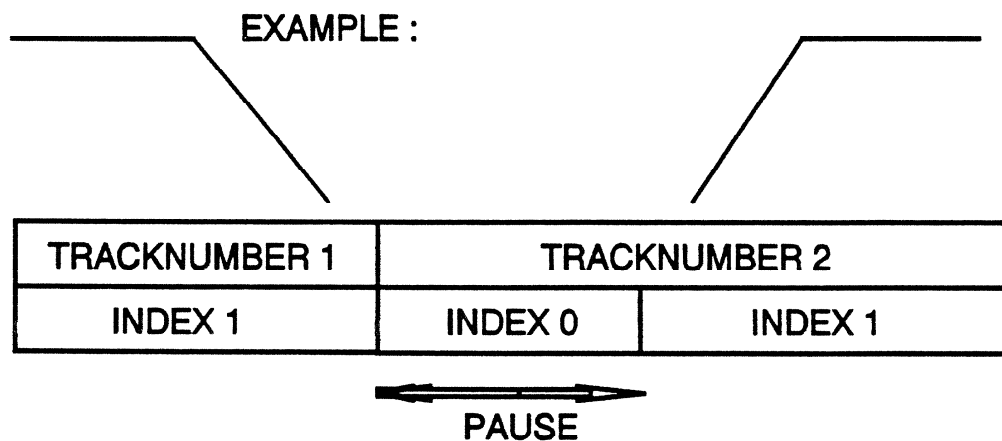


PRESET REC MUTE TIME

RECORDING A PAUSE AT THE BEGINNING
OF A NEW TRACK

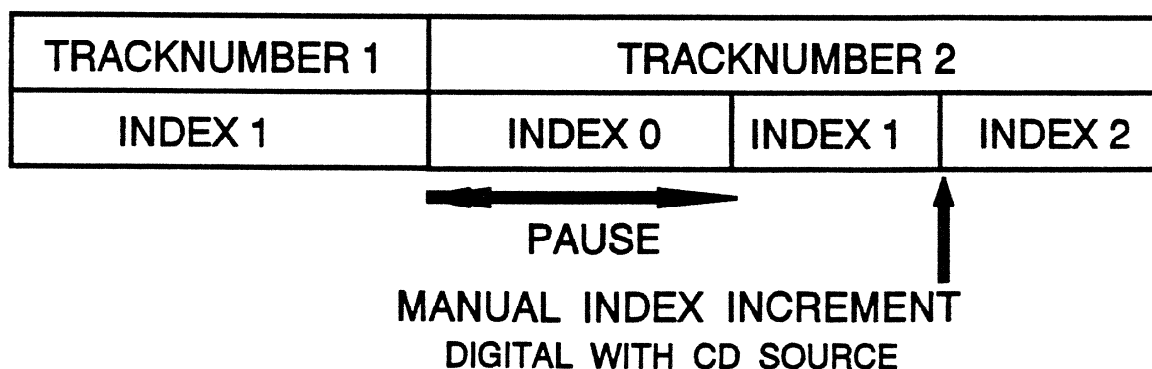
ADJUSTABLE : 2 - 5 SEC IN 0.5 STEPS

ONLY POSSIBLE AT THE BEGINNING OF A TRACK
(RED BOOK STANDARD)



PUSH REC-MUTE TO END A RECORDING WITH DIGITAL SILENCE

MANUAL INDEX INCREMENT



MONITOR

Push REC with no disc inside

IN MONITOR MODE :

- **AD CONVERTER : 44.1 kHz / 20 BIT
WITH ANALOGUE INPUT SELECTED**
- **DA CONVERTER : 20 BIT RESOLUTION
WITH DIGITAL INPUT SELECTED**
- **SAMPLE RATE CONVERTER :
WITH DIGITAL INPUT SELECTED
32 - 58 kHz TO 44.1 kHz / 20 BIT
Channel Status: Category Code GENERAL
PERFECT DE - JITTERING**

RECOVERY

- REPAIR OF DISC AFTER AC - MAINS FAILURE
- REPAIR OF FAULTY DISC

THE CD - RECORDER WILL DETECT A FAULTY DISC

DURING RECOVERY OF THE FAULTY DISC
DISPLAY WILL INDICATE " RECOVERY "

AFTER SUCCESSFULL RECOVERY :
THE DISC WILL BE FINALIZED AUTOMATICALLY

WHEN THE DISC CAN NOT BE REPAIRED:
DISPLAY WILL INDICATE " ERROR-11 "
AND THE TRAY WILL OPEN
THE DISC CAN NOT BE USED ANYMORE

ADDITIONAL FUNCTIONS

- * **MANUAL INDEX RECORDING**
Maximum of 99 indexes can be recorded in a track
- * **INDEX SEARCH DURING PLAYBACK**
- * **COPY PROHIBIT ON / OFF (recording)**
- * **ISRC CODE RECORDING**
- * **EAN / UPC CATALOG NUMBER RECORDING**
- * **PEAK HOLD DISPLAY INDICATION**
- * **HEADROOM DISPLAY INDICATION**
- * **SAMPLE RATE CONVERSION ON / OFF**

COPY PROHIBIT ON / OFF

SETS Q - CHANNEL C-BIT STATUS DURING
RECORDING
COPY PROHIBIT - COPY ALLOWED
CHANGES NOT POSSIBLE DURING RECORDING

EAN/UPC CODE RECORDING

SETS Q-CHANNEL (MODE 2) DATA EAN/UPC - CODE
ONLY IN CASE OF A BLANK DISC
MUST BE IDENTICAL OVER COMPLETE DISC

ISRC CODE RECORDING

SETS Q-CHANNEL (MODE 3) DATA ISRC - CODE
DATA CAN BE CHANGED PER TRACK

SRC ON / OFF

ONLY VALID FOR 44.1 kHz DIGITAL INPUT
SRC OFF: CLOCK IS DERIVED FROM 44.1 kHz INPUT

PEAK HOLD HEADROOM

SELECTS INDICATION OFF:

- TRACKNUMBER
- PEAK HOLD VALUE
- HEADROOM

PEAK VALUE IS RESET IF KEY IS PRESSED > 1,5 SEC

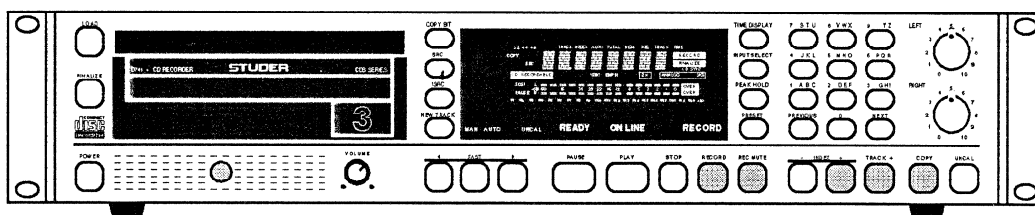
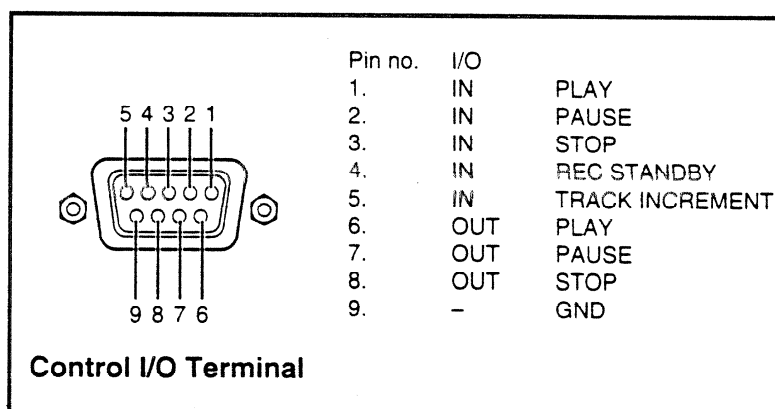
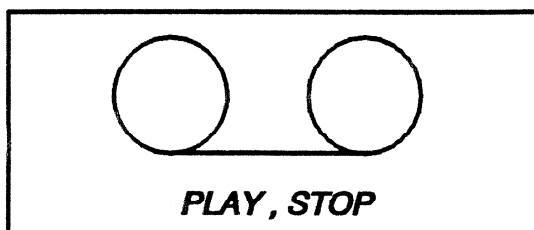
HEADROOM INDICATION UPDATED EVERY SECOND

HEADROOM INDICATION FROM:

- 80 dB to -40 dB in steps of 5 dB
- 40 dB to -20 dB in steps of 2 dB
- 20 dB to -10 dB in steps of 1 dB
- 10 dB to 0 dB in steps of 0.5 dB

PARALLEL REMOTE CONTROL CONTROL I/O

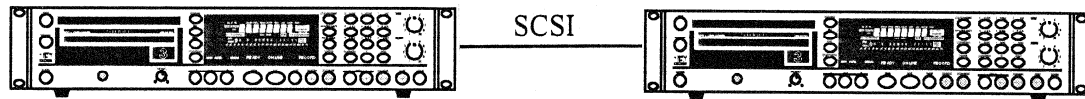
SOURCE



AUTOMATIC START AND STOP OF THE SOURCE
AUTOMATIC START AND STOP OF THE CD-RECORDER

OUTPUT TERMINALS ARE ONLY ACTIVE
DURING : RECORDING / REC.STANDBY

DOUBLE SPEED COPY



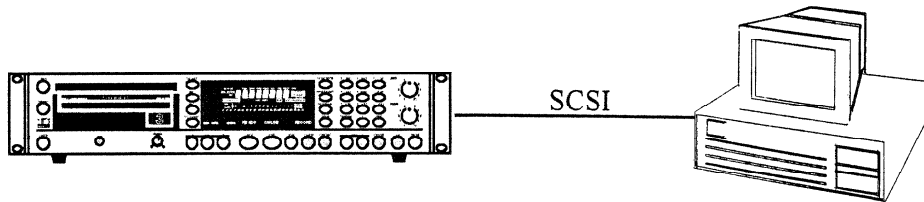
THE SCSI INTERFACE ALLOWS FAST AND EASY
DOUBLE SPEED COPY BETWEEN TWO GDR620's OF
THE FOLLOWING FORMATS:

- CDR-DA
- CDR-ROM mode1
- CDR-ROM mode2 / form1
- CD-DA
- CD-ROM mode1 (only track 1)
- CD-ROM mode2 / form1 (only track 1)

INDEXES INSIDE TRACKS ARE NOT COPIED
AUDIO TRACKS ARE COPIED WITHOUT INTERPOLATION

COPY PROCESS : TRACK - BY - TRACK
BETWEEN TRACKS THERE WILL BE LINKING - AREAS

SCSI



THE SCSI INTERFACE ALLOWS THE STUDER D741 TO SUPPORT SOFTWARE SYSTEMS FROM MS-DOS AND WINDOWS TO MAC AND UNIX. AUTHORIZING SOFTWARE PACKAGES GIVE USERS THE POSSIBILITY TO ARCHIVE, DISTRIBUTE AND CREATE THEIR OWN CD'S FROM THEIR DESKTOP.

PERFORMANCE

| | |
|----------------------------------|---|
| CD - formats supported | CD-DA, CD-ROM (XA) CD- Bridge Multi-session CD-I, Video-CD, |
| Write methods | Track At Once, Disc At Once, Multi-session |
| Capacity (mode 1)(63 min. media) | 550 Mbytes |
| Capacity (mode 2)(63 min. media) | 630 Mbytes |
| Capacity (mode 2)(74 min. media) | 740 Mbytes |
| Average access time | 390 msec. |
| Transfer rate (double speed) | 352 kb/sec read or write |
| Interface | SCSI - II |
| Data integrity | 10 -16 |
| Data buffer (internal cache) | 1 Mb |

SCSI RECORDER IDENTIFICATION: PHILIPS CDD2000 SOFTWARE PREPARED FOR CDD2000 CA BE USED DIRECTLY WITH STUDER D741.

THE FOLLOWING SCSI INTERFACE CARDS ARE TESTED:

ADAPTEC AHA-1542/1540/2940

ADVANSYS ABP-510

SCSI

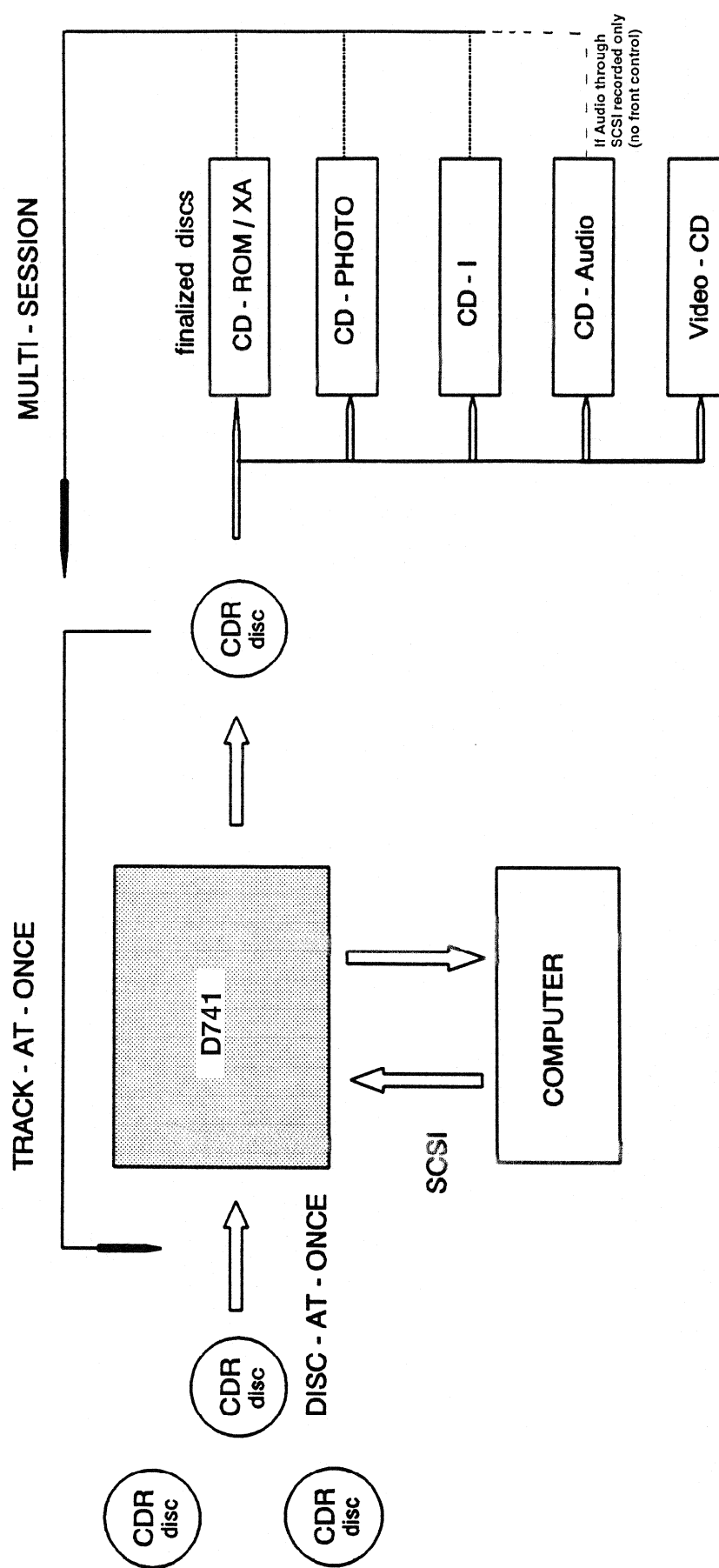
A GROWING NUMBER OF SOFTWARE DEVELOPMENT COMPANIES INCLUDE DIRECT INTERFACING WITH STUDER D741

- **SCSI CABLES ARE NOT INCLUDED WITH STUDER D741**
- **MAKE SURE THAT THE DIP-SWITCH SETTINGS OF STUDER D741 ARE CORRECT BEFORE CONNECTING TO THE HOST COMPUTER**
- **CONNECT AND SWITCH ON STUDER D741 BEFORE INSTALLING THE AUTHORING SOFTWARE ON THE COMPUTER**
- **SELECT PHILIPS CDD2000 AS THE CD-RECORDER IN THE AUTHORING SOFTWARE**

THE LIST BELOW ARE EXAMPLES OF SOFTWARE PACKAGES AND COMPANIES IN WHICH THE STUDER D741 IS ALREADY INCORPORATED:

| SOFTWARE PACKAGE | COMPANY |
|-------------------------|----------------------|
| - TOAST | ASTARTE |
| - WINONCD | CEQUADTRAT |
| - CD CREATOR | COREL |
| - EASY CD | INCAT SYSTEMS |
| - SPIRA | MONIKER |
| - NETSCRIBE | MERIDIEN DATA |
| - PSCRIBE | MERIDIEN DATA |
| - GEAR | ELEKTROSON |

SCSI OPERATION MODES



NICE TO KNOW

96019.cs

- 9-pin GPI output only during recording/rec.standby (PLAY,PAUSE,STOP)
- During reading TOC the display shows READING.
During READING the tray will not open until TOC is read.
- SRC OFF and out of window:display "UNLOCK" and to REC.STANDBY
- Auto-1 is working with the analogue input selected
- Selection of AUTO-1 ON will switch TRACK INCREMENT SELECT to AUTO one time.
- In MONITOR mode: 44.1/20bit resolution output
- After starting recording the audio in the monitor path is muted for 1 sec by the DSP.
Recording on the disc is oke.
- Repeat all: in PAUSE push two times FINALIZE (to be used for testing)
- OVER in level display lights up at -0,5 dB (analogue input)
- Levelbar,headphones,XLRdig.out: after DSP
Analogue Out,SPDIFdig.out: before DSP
Before DSP you will not hear FadeIn/Out, Rec.Mute actions
- In PAUSE mode, the Search Forw/Rev keys will be frame-by frame positioning
- If in standalone (audio) mode, a data-track (ROM) is played, the display will indicate "NO AUDIO" and the recorder will go to PAUSE mode.
- When a remote is connected, the display will indicate REMOTE for 3 seconds.
After that, only the remote symbol will light up to avoid "burning -in" of the display.
- When switching to SCSI mode, the display (remote or set) will indicate SCSI for 3 seconds. After that only the scsi-label in the display will light up to avoid "burning-in" of the display.
- With the REC.MUTE button a recording can also be ended with digital silence.
- Next/Previous actions during playback takes 2 seconds.

LIST OF ABBREVIATIONS

| | |
|----------|--|
| A1 | : Calculation β and HF0 |
| A2 | : $\text{Beta} = (A1-A2)/(A1+A2)$ |
| ACA | : Access Allowed signal |
| ACK | : Acknowledge serial communication user μP |
| ACKA | : Port 'A' acknowledge |
| ACKB | : Port 'B' acknowledge |
| AINT | : ALPHA integrator |
| ALFA | : Actual absorption |
| ALFALS | : Absorption loop switch |
| ALFA0 | : Absorption set value from μP max 4.0V (0...255 DAC) |
| ALFA3 | : Absorption error detection |
| ALFAC | : Absorption during writing |
| ALLOWERR | : Allow Error |
| ALON | : Alpha loopswitch on |
| ALS | : Alpha loopswitch |
| AMON | : Alpha Measurement ON |
| AREF | : Sample value of AINT |
| ASTROBE | : Absorption strobe |
| ASY | : Interrupt request for reading Atip |
| ATTADS | : Attention scsi-bus |
| ATTBE | : Attention signal |
| AZIN | : + in for ALPHA0 |
| AZREF | : - in for ALPHA0 |
| A1 | : Positive peak detector between CA and CALF |
| A2 | : Negative peak detector between CA and CALF |
| A0 .. 16 | : Address bus |
| BARCODE | : Barcode signal |
| BSY | : Busy (SCSI input signal) |
| BTARG | : Potmeter for beta target ADC for beta correction adjustment input to μP |
| CA | : Central Aperture (C1+C2+C3+C4) DC -> for Mod. calculation |
| CAGAIN | : Power input for amplification factor of CA for servo signals |
| CAHFE | : CA High frequency |
| CALF | : CA low frequency |
| CALPF | : CA low pass filter |
| CDMLAS | : high/low power laser (jumper on laser PCB) |
| CECS | : Chip select CDCE |
| CEFS | : EFM frame sync |
| CEPB | : Subcode P-channel input |
| CERES | : Reset CDCE |
| CERS | : Register select CDCE |
| CESSY | : Subcode sync |
| CE_INT | : CDCEP interrupt |
| CFLAG | : Correction flag output (CD65) |
| CLCE | : μC clock output encoder (CDCEP) |
| CLD | : I ² S clock |
| CLDE | : μC clock output decoder (CD65) |
| CLDS | : μC clock output DSICR |
| CLIN | : I ² S clock input (CDCEP) |
| CLKIN | : clock signal |
| CLOUT | : I ² S bitclock output (CD65) |
| CLWP | : μC clock Atip information CDCEP |
| COMCLK | : Communication clock from user μP |
| CSADS | : ADS-SCSI chip select |
| CSCDBD | : chipselect CDBD |

| | |
|------------|--|
| CSCDBE | : chipselect CDBE |
| CSGAIN | : Amplification factor alpha and beta measurement |
| C_D | : Command/Data (Bidirectional SCSI signal) |
| C1 ... 4 | : Main spots |
| DACE | : μ C data I/O CPCEP |
| DAD | : I ² S data |
| DADE | : μ C data CDLIP |
| DADS | : μ C data I/O DSICR |
| DAIN | : Data signal (CDCEP) |
| DAZFA | : See FS Limit |
| DAOUT | : I ² S data output (CD65) |
| DAWP | : μ C data Atip information (CDCEP) |
| DA0 ... 8 | : Buffer address |
| DB0 ... 8 | : SCSI data bus |
| DPH | : Delta P 20% active low, default high |
| DPL | : Delta P 10% active low, default high |
| DSSY | : Decoder subcode sync |
| D0 ... 7 | : Data bus bit 0-7 |
| E | : E-clock microcontroller (2MHz) |
| EBU | : Digital output |
| EFIN | : Error flag signal |
| EFM | : Eight to fourteen modulation 2: CDCEP output for monitoring (reduced voltage from CD65 to MONON) |
| EFMM | : EFM N-1 |
| EFMCLK | : EFM clock 4.3218 or 8.6436 MHz |
| EFMD | : Eight to fourteen modulation detect |
| EFOUT | : Error flag output CDROM (CD65) |
| EFS | : EFM frame sync output (CDCEP) |
| ENINT | : Enable interrupt |
| ERON | : Error on (servo) |
| ERROR | : Led indicating an error |
| ERRPWM | : Motor control signal input |
| ERR_I/O | : Error input/output |
| FEN | : Focus error normalized = $(C1 + C3 - C2 - C4) / (C1 + C2 + C3 + C4)$ |
| FOC+, FOC- | : Focus actuator |
| FS | : FS=FSO-DALFA (write power to laser control) |
| FSCDM1..2 | : Controlled forward sense sensitivity |
| FSF | : Write power filtered (FS filtered) |
| FSLIMIT | : Control of DALPHA if FS>+4.3V diff of ALPH0 and ALFAC |
| FSO | : Forward sense diode reference current (write power setting from μ P 4.3V=DAC 0 ... 255) |
| GAIN | : 12cm or 8cm recordable disc (μ C) |
| HCA1..2 | : Peak detector A1, A2 |
| HF | : High frequency reading signal after MTF equalizing |
| HMSW | : Home switch |
| H0 ... 7 | : Host data bus |
| INTADS | : Interrupt request ADS |
| INTSEL | : Integrator to opamp or Vref (μ C) |
| IPPN | : Current PPN |
| IREAD | : Laser read current |
| IWRITE | : Laser write current |
| IX | : Current X |
| I-O | : Input/output (bidirectional SCSI signal) |
| LASPOR | : Switch function (Laser current 40% higher; H=2 = high and CDM LAS = high) |
| LASWR | : Laser write/read |
| LDCE | : μ C load input (from CDCEP) |
| LDDE | : μ C load output decoder |
| LDOS | : μ C load output DSICR |

| | |
|------------|---|
| LDON | : Laser diode on (on read) |
| LOCK | : Lock signal from decoder |
| LWRT | : Laser at writing power |
| MCKN | : Master clock not |
| MCLK | : Bit clock output (CDCEP) |
| MCSEL | : Motor control selection |
| MCSSEL | : Motor control signal select |
| MCTRL | : Motor control switch (wobble/decoder)/tacho (μ C) |
| MERR | : Motor control error signal |
| MIRN | : Mirror normalized |
| MONEN | : Monitor function |
| MONON | : Monitoring EFM from CDCEP to CD65 |
| MOT | : Spindle motor signal |
| MOTOFF | : Motor off |
| MREF | : PWM output tacho |
| MSG | : Message (bidirectional SCSI signal) |
| NEGAIN | : Amplification factor fault signals and beta measurement |
| NIRQ | : Interrupt request wobble processing (CDCEP) |
| NRSMP | : None read sample (active low) during EFM |
| NRQ | : Interrupt request CDBE |
| N2 | : N=high (double speed) |
| N2N | : Switch for wobble filter |
| OTD | : Off track detection DISCR |
| PMON | : Power monitoring laser (warning to μ P when FS > 4.3V) |
| POWOK | : Writing power ok |
| PP | : XB or PPN (read or write) |
| PPN | : Normalized push pull signal |
| PPULS | : Delta P pulse timing |
| PWR_OFF | : Power off detection input from user |
| QCL | : Q-channel clock |
| QDA | : Q-channel data |
| QRA | : Q-channel request acknowledge |
| RAD+, RAD- | : Radial actuator |
| RADINT | : Radial actuator integrator voltage |
| RA0 ... 8 | : Ram address bus (CDB2) |
| RD | : Read puls |
| RDAO ... 7 | : Ram data bus (CDB2) |
| READY | : Led indicating drive ready |
| REN | : Radial error normalized |
| RESEN | : Reset CDCEP from μ P |
| RESET | : Reset from μ P to DSICR and CD6 |
| RESDEC | : Reset decoder CXD2500Q |
| REQ | : Request (SCSI input signal) |
| REQA | : Port 'A' request |
| REQB | : Port 'B' request |
| RINTOFF | : Read integrator off (control Read current to Laser) |
| RINTON | : Read integrator on |
| RSTADS | : Reset ADS-chip |
| RSTIN | : Reset micro controller (from user) |
| RW | : Read/write |
| RXD | : Receive data input (testing only) |
| R-W | : Up read/write signal |
| SACK | : Service acknowledge |
| SDAT | : Servo data |
| SDB0 ... 8 | : SCSI data bus |
| SDGAIN | : Current to control the grating ratio of the satellite spots to the main spots |
| SEL | : Select (SCSI input signal) |
| SI | : Serial data communication user |

| | |
|------------|---|
| SL+, SL- | : Sledge motor |
| SO | : Serial communication data output to user μ P |
| SPEED | : Speed selection N=1/N=2 |
| SPMOT | : Spindle motor |
| SREQ | : Servo request |
| SRST | : Servo reset |
| SRSTMP | : Reset servo microcontroller |
| SSY | : Subcode sync output CDCEP |
| STEFM | : Switch EFM from disc/EFM from CDCE |
| STOPM | : Stop motor switch |
| SUMREF | : Minimal power where above the normalizing works for servo signals |
| SWRT | : Start write 9μ S (one shot at start up LWRT) |
| SYSCLOCK | : System clock |
| S1,S2 | : Satellite spots |
| TACHPLS | : Tacho puls input CDM |
| TLN | : Track loss normalized |
| TRIN | : Tray in switch |
| TRMOT | : Tray motor control |
| TROUT | : Tray out switch |
| TRS1 | : Tray switch input |
| TRS2 | : Tray switch input |
| TXD | : Transmit data output (testing only) |
| UCL | : Serial data transfer clock |
| UDAT | : Serial data from CPU |
| ULAT | : Serial data latch puls |
| VREF | : Typical 2.5V |
| WINTOFF | : Write integrator off (control write current to laser) |
| WINTON | : Write integrator on |
| WOBL | : Digital wobble after wobble filter and slicer (CDCEP to μ C) |
| WP0 | : μ P osc. input NOT USED! |
| WP1 | : μ P osc. input NOT USED! |
| WPCS | : Chip select WPC |
| WPDEC | : Motor control switch wobble/decoder |
| WRITE | : Led indicating writing |
| WR | : Write puls |
| WRLASER | : Write/read laser, laser is switched with EFM timing (EFM N-1) |
| WR0 | : Selection write port 0 |
| WR1 | : Selection write port 1 |
| WSENC | : Word select output from encoder (master) CDCEP |
| WSIN | : Word select signal CDCEP |
| SWOUT | : I ² S wordselect output (CD65) |
| X | : Fault signal X, not filtered and not normalized |
| XB | : X balanced |
| XDN | : X detection normalized |
| XFER | : Indicating actual data transferring |
| XIRQ | : Non maskable interrupt to microcontroller |
| XTAL | : 16MHz clock output to DAC (CD65) |
| Y | : Fault signal Y, not filtered and not normalized |
| 4A0 ... 10 | : Ram address bus (CDCE) |
| 4M | : 4x buffered clock (8MHz) |
| 4RD0 ... 7 | : Ram data bus (CDCE) |

Mounting CDM24

Building up the CDM starting from the mounting plate with the turntable motor included (service part).

Sledge motor

- ▶ Replace sledge motor with its black-spring and the motor holding blade-spring.
- ▶ Apply also a small amount of grease to the end of the gear spindle.

OPU

- ▶ Replace the spindle and the gear-rack with its spring.
- ▶ Now the complete OPU can be replaced on the mounting plate.
- ▶ First enter the opposite side of the spindle in the mounting plate and then the whole spindle in the mounting plate.
- ▶ Replace the spindle spring clips.
- ▶ First place one end of the spring clips near the spindle and then push the other end through the holes in the mounting plate until it clicks to its place.

Gear

- ▶ Before placing the gear on its shaft bend over the gear-rack inside so the gear rack is not in touch with the gear spindle.
- ▶ After this, replace the gear while keeping the rack into its previous described position.

CDM24 panel

- ▶ Replace the panel, mount the 4 screws and the flexwire. Resolder the sledge motor wiring to the panel.

CDM sub-chassis

- ▶ Replace the subchassis with two screws to the rear side of the mounting plate.

Grommets

- ▶ Replace the 4 damping grommets into its corresponding holes on the mounting plate.

SERVICE MODE

Activating:

The D741 is switched to service mode as follows:

- Power the unit off and separate it from the mains.
- Disconnect the 3 wires from the CD-R drive to the ADDA Board 1.641.063.20 (Connectors 1103, 1105, and 1109).
- Connect the Service Board (order No. **xx.xxx.xxx.xx**) to the connectors 1103 and 1109.
- Press the RECORD and REC MUTE keys while powering the unit on.

The display shows "SERVICE" and indicates that the service mode has been entered.

The service mode can be left at any time by pressing STOP and switching the unit off and on again.

Commands:

To execute the service commands the following keys are used:

- RECORD** Indicates the ROM version of the D741; this key can only be used immediately after having entered the service mode.
- LOAD** Sends a general reset command to all ICs (GDIN, ADMOD, DAIO, NPC, μ P).
The display indicates "RST BRD" (Reset Board).
- PLAY** Playback mode. The board enters slave mode.
Unlock goes low.
This function only works if an AES/EBU signal (TTL level) is sent to connector 1105/pin 2.
This function cannot be used for service purposes.
- PAUSE** AD/DA mode.
Unlock goes high.
Quartz clock reference is in fixed mode, ± 50 ppm.
Connect an analog signal source to the INPUT LEFT/RIGHT connectors.
The audio signal can be monitored with the built-in speaker, at the headphones output, at the analog OUTPUT LEFT/RIGHT connectors, or at the S/PDIF or AES/EBU digital outputs.
The display indicates "ANA REC".
- TRACK** S/PDIF digital input mode, without SRC (Sampling Rate Converter).
Unlock goes low.
Connect a digital signal (e.g. from a CD player) to S/PDIF IN.
The audio signal can be monitored with the built-in speaker, at the headphones output, at the analog OUTPUT LEFT/RIGHT connectors, or at the S/PDIF or AES/EBU digital outputs.
If the board does not lock, "NO LOCK" will be displayed.
If the input signal is not within ± 50 ppm, the SRC will automatically be activated and "NO SLAV" will be displayed.
If "NO LOCK" or "NO SLAV" appears and the faulty condition has been corrected, press TRACK again.
The display indicates "CIN REC" (Cinch Record).

- NEXT** AES/EBU digital input mode, without SRC (Sampling Rate Converter).
Unlock goes low.
Connect a digital signal (e.g. from a CD player) to AES/EBU DIGITAL IN.
The audio signal can be monitored with the built-in speaker, at the headphones output, at the analog OUTPUT LEFT/RIGHT connectors, or at the S/PDIF or AES/EBU digital outputs.
If the board does not lock, "NO LOCK" will be displayed.
If the input signal is not within ± 50 ppm, the SRC will automatically be activated and "NO SLAV" will be displayed.
If "NO LOCK" or "NO SLAV" appears and the faulty condition has been corrected, press NEXT again.
The display indicates "XLR REC" (XLR Record).
- PREVIOUS** S/PDIF digital input mode, with SRC (Sampling Rate Converter).
Unlock goes high.
Connect a digital signal with a sampling rate between 32 and 50 kHz to S/PDIF IN.
The audio signal can be monitored with the built-in speaker, at the headphones output, at the analog OUTPUT LEFT/RIGHT connectors, or at the S/PDIF or AES/EBU digital outputs.
If the board does not lock, "NO LOCK" will be displayed.
If "NO LOCK" appears and the faulty condition has been corrected, press PREVIOUS again.
The display indicates "CIN REC" (Cinch Record).
- INPUT SELECT** AES/EBU digital input mode, with SRC (Sampling Rate Converter).
Unlock goes high.
Connect a digital signal with a sampling rate between 32 and 50 kHz to AES/EBU DIGITAL IN.
The audio signal can be monitored with the built-in speaker, at the headphones output, at the analog OUTPUT LEFT/RIGHT connectors, or at the S/PDIF or AES/EBU digital outputs.
If the board does not lock, "NO LOCK" will be displayed.
If "NO LOCK" appears and the faulty condition has been corrected, press INPUT SELECT again.
The display indicates "XLR REC" (XLR Record).
- ◀ (Search reverse)** Cascade mode (toggle key).
Connect a digital signal (e.g. from a CD player) to AES/EBU DIGITAL IN.
In cascade mode the AES/EBU input signal is directly looped to the AES output via a buffer; the output signal will be completely identical with the input signal.
The audio signal can be monitored with the built-in speaker, at the headphones output, or at the analog OUTPUT LEFT/RIGHT connectors.
The audio signal is also available at the S/PDIF digital output. However, this signal is *always* routed via the SRC.
The display indicates either "CASC ON" or "CASC OFF"; make sure to select the desired status when leaving the cascade mode.

- ▷ **(Search forward)** Analog deemphasis mode (toggle key).
Connect an analog signal source to the INPUT LEFT/RIGHT connectors. When activating deemphasis mode, a high frequency (approx. 10 kHz) will audibly be attenuated when monitoring with the built-in speaker, at the headphones output, or at the analog OUTPUT LEFT/RIGHT connectors.
At both digital outputs, the emphasis bit is set in the data stream. The display indicates "EMPH ON" or "EMPH OFF"; make sure to select the desired status when leaving the analog deemphasis mode.
- FINALIZE** Input sensitivity (toggle key).
Connect an analog signal source to the INPUT LEFT/RIGHT connectors.
The input sensitivity can be toggled between +4 dBu and -10 dBu. The audio signal can be monitored with the built-in speaker, at the headphones output, at the analog OUTPUT LEFT/RIGHT connectors, or at the S/PDIF or AES/EBU digital outputs.
The display indicates either "SENS +4" or "SENS -10"; make sure to select the desired status when leaving the input sensitivity mode.
- PRESET** EEPROM test.
The internal EEPROM will be tested as follows:
- The content of the first EEPROM address will be read and stored in a buffer.
 - \$FF will be written to the same EEPROM address.
 - The content of this address will be read and compared with \$FF.
 - If the data written and read are equal, the content stored in the buffer will be restored to its previous address.
 - The pointer proceeds to the next EEPROM address.
- During the test, "EEP xxx" is indicated, where xxx is the EEPROM byte currently tested.
This procedure will take about 1.5 minutes.
After a successful test "TESTED" will be indicated.
If the data should not be equal, "EEP ERR" is indicated, and the EEPROM test is stopped.
- TIME DISPLAY** EEPROM clear.
Clears the internal EEPROM and sets the default PRESET settings. The display indicates "RST EEP" followed by "DEFAULT".
- COPY** CD-R drive diagnostics.
Before running this test, the D741 must be separated from the mains. Remove the Service Board and reconnect the CD-R drive to the ADDA Board 1.641.063.20 (Connectors 1103, 1105, and 1109).
Make sure to re-enter the service mode by pressing the RECORD and REC MUTE keys while switching the unit on.
The display will indicate "DIAGNOSE" for about 30 seconds. After a successful test "CDD 0000" is indicated.

When finished:

Make sure to terminate the service mode by pressing STOP and switching the unit off.