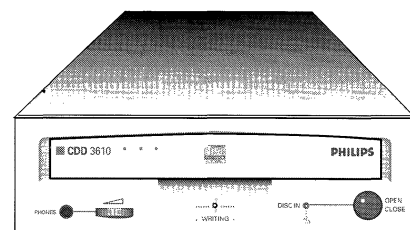


Service Service Service

CD - ReWritable



Service Manual

Features of the CDD3610 CD Recordable/ReWritable

- Third generation design.
- Writes data at normal, or two times standard CD-speed, and reads up to 6.5 times normal speed.
- Capability of writing multiple logical volumes on one physical disc (multiple sessions).
- Supports Incremental Packet Writing for data storage applications and "drag and drop".



The optical deck

The CDD3610 is equipped with compact disc mechanism: CDM3600

The ordering code is 4822 691 10592

The CDM deck is part of Loader CDL 3600

Service data is included in this manual.

(SF) Varoitus!

Laite sisältää laserdiodin, joka lähettää näkymätöntä silmille vaarallista lasersäteilyä.

(S) Varning!

Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad. Betakta ej strålen.

(DK) Advarsel!

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

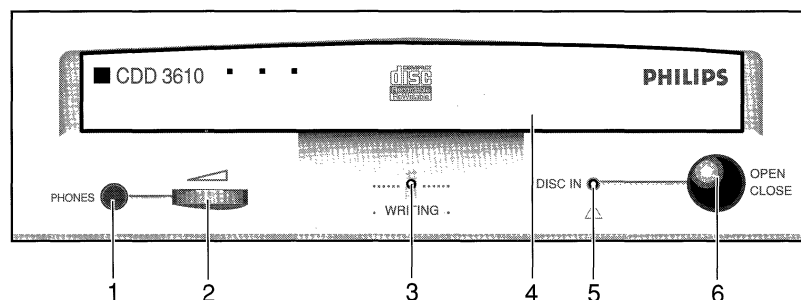
(GB)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.



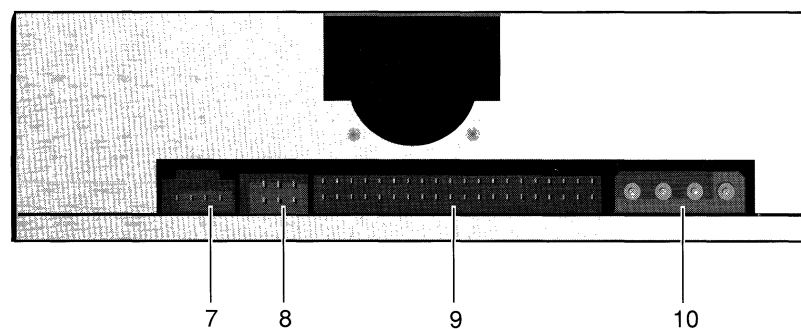
CDD3610 - Compact Disc Recorder

FRONT VIEW



1. Headphone plug
2. Headphone volume control
3. Write indicator
4. Disc tray
5. Disc In/Read/Error indicator
6. Open/Close button

REAR VIEW



7. Audio Line Out connector
8. Jumperblock
9. IDE connector
10. Host DC power connector

SUMMARY OF CONTROLS AND CONNECTIONS

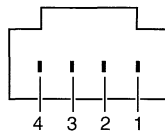
FRONT VIEW

1. **Headphone plug**
Connect your headphone to listen to CD-DA discs (or tracks).
2. **Headphone volume control**
Turn the wheel to the right to increase the audio volume of your headphone.
3. **WRITE indicator**
Lights "orange" when writing of a disc occurs.
Flashes "orange" during write emulation.
4. **DISC TRAY**
5. **DISC IN/READ/ERROR indicator (dual color LED)**
Lights "green" when a disc is present. Flashes "green" asymmetrically when data is being transferred from disc.
Flashes "green" symmetrically when starting up a disc.
Lights "red" upon error (e.g. after failed selftest).
6. **OPEN/CLOSE KEY**
Press the OPEN/CLOSE key to open the disc loading tray. To close the disc loading tray, push gently at the front of the tray or press the Open/Close key.

REAR VIEW

8. Audio Line Out Connector

- 1: Left
- 2: GND
- 3: GND
- 4: Right



8. Jumperblock

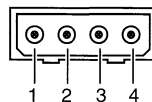
These jumpers are used to select Master/Slave mode and Cable Select.

9. IDE Connector

40 pin IDE flatcable connector .

10. Host DC Power Connector

- 1: +12V
- 2: GND
- 3: GND
- 4: +5V



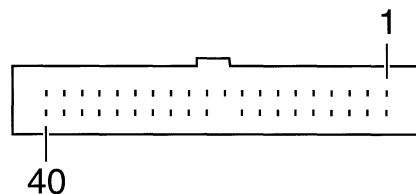
Electrical interface (front of drive)

- Headphone Jack
- RMS OUTPUT voltage: 3,1V at 120Ω.
- Signal-to-Noise Ratio: 80 dB typ. A weighted.

Electrical interface (rear of drive)

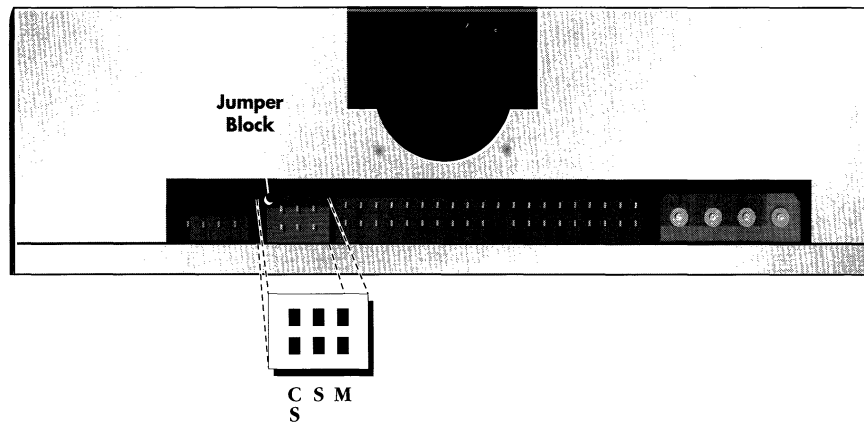
- Audio line out: RMS OUTPUT voltage 1V at 470Ω
- Signal-to-Noise Ratio: 80 dB typ. A weighted.
- Data interface: 40 pin IDE flatcable (see below)
- Power Supply:
 - voltage requirements: +12V (+5%) +5V (+5%)
 - current requirements: +12V 160 mA typ.
200 mA max.
+5V 1 A typ.
1,5 A max.

Interface Pin Table

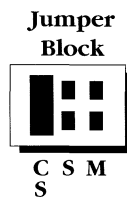


SIGNAL	PIN NUMBER	SIGNAL	PIN NUMBER
RESET	01	DMA REQUEST	21
GROUND	02	GROUND	22
-DB(7)	03	I/O WRITE	23
-DB(8)	04	GROUND	24
-DB(6)	05	I/O READ	25
-DB(9)	06	GROUND	26
-DB(5)	07	I/O READY	27
-DB(10)	08	SPSYNC:CSEL	28
-DB(4)	09	DMACK-	29
-DB(11)	10	GROUND	30
-DB(3)	11	INTRQ	31
-DB(12)	12	16 BIT I/O	32
-DB(2)	13	DA1	33
-DB(13)	14	PDIAG-	34
-DB(1)	15	DA0	35
-DB(14)	16	DA2	36
-DB(0)	17	CHIP SELECT 0	37
-DB(15)	18	CHIP SELECT 1	38
GROUND	19	DASP-	39
REMOVED	20	GROUND	40

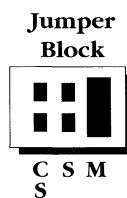
Jumper Block



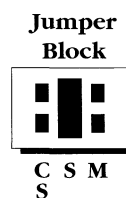
- * When a shorting jumper is in the "CS" (CSEL) position, the device will use the host interface signal CSEL to configure the device.



- * When the shorting jumper is placed in the "M" (MASTER) or "S" (SLAVE), the drive will be configured accordingly.



OR



WARNINGS AND SAFETY INSTRUCTIONS



DANGER

As the laserbeam used in this equipment is harmful to the eyes do not open the set. Invisible laser radiation when the set is open.
(Class 3B laser)

AVOID DIRECT EXPOSURE TO BEAM.

WARNING

Use of controls or adjustments or performance other than those specified herein may result in hazardous radiation exposure.

WARNING

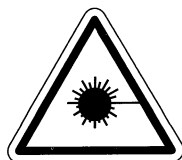
The use of optical instruments with this product will increase eye hazard.

Laser Device Unit (LT025MD or CQL7840/01)

Material:	GaAIAs
Wave length:	775 ~ 795 nm (at 30 °C)
Laser output:	Read: 0.7 - 0.9 mW Write: 13 - 18 mW



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



**CLASS 3B
LASER PRODUCT**

CAUTION

VARO!

VARNING

ADVERSEL

DANGER

VORSICHT

INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE BEAM

AVATTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASER SÄTTEILYLLE ÄLÄ KATSO SÄTEESSEN

OSYNLIG LASERSTRÄLNUNG NÄR DENNA DEL ÄR ÖPPNAD BETRAKTA EJ STRÄLEN

USYNLIG LASERSTRÄLING VED ÅBNING. UNDGÅ UNSÄTTELSE FOR STRÄLING

INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM

UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETZEN

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Selftest
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Exploded View CDM3600
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Chapter 7

Technical Data
List of Abbreviations
Overall Block Diagram
Wiring Diagram

Chapter 1

TECHNICAL DATA

Performance:

Capacity:	120mm disc	600 Mbytes/700 Mbytes
	80mm disc	200 Mbytes
Access time average 1/3 data:		350 msec
Access time max:		< 750 msec
Data-transfer-rate (recording/reading):		352,8 Kbytes/sec sustained (double speed, mode 2 data) 176,3 Kbytes/sec (single speed, mode 2 data)
Data-transfer-rate (read only):		Up to 1145 Kbytes/sec (zoned-6 speed, mode 2 data)
Max. burst rate:		≥ 2,5 Mbytes/sec
Interface:		(Enhanced) IDE
Form factor:		5,25" Half Height (drive should be mounted and used horizontally)
Data integrity drive, assuming new discs:		10 ⁻¹⁶
Data buffer:		1MB
Disc loading:		Tray (motorised)

Dimensions: H x W x D 41.5 x 146 x 206 mm

Weight max: 1 kg

Power dissipation: max. 8 W

Environmental:

Operating temp	5 to 40 °C (41 to 104 °F)
Non operating temp	-25 to 70 °C (-13 to 158 °F)

Reliability:

MTBF (hours 20% duty cycle)	120.000 POH
-----------------------------	-------------

Electrical interface (front of drive):

Headphone Jack	
RMS Output voltage:	3,1V at 120Ω
S/N Ratio:	80 dB typ. A weighted

Electrical interface (rear of drive):

Audio line out RMS Output voltage:	1V at 470Ω
S/Noise Ratio:	80 dB typ. A weighted
Data interface:	40 pin IDE flatcable
Power Supply:	
- voltage requirements:	+12V ±5%, +5V ±5%
- current requirements:	+12V 160 mA typ. 200 mA max. +5V 1 A typ. 1,5 A max.

Audio performance:

Audio specification for line out:

	On pressed CD	On recordable CD
Output Voltage	1 V rms	1 V rms
Unbalance	max 0.25 dB	max 0.25 dB
Output Impedance	470 Ω	470 Ω
Amplitude Linearity	1.5 dB (20 Hz - 20 kHz)	2.5 dB (20 Hz - 16 kHz)
S/N-ratio	81 dB (84 dB A-wtg)	80 dB (82 dB A-wtg)
Total Harmonic Distortion + Noise	65 dB (1kHz)	55 dB (1kHz)
Outband attenuation	min. 50 dB above 25 kHz	min. 50 dB above 25 kHz
Channel separation	min. 70 dB (20 kHz)	min. 65 dB (16 kHz)
Muting level during random access	min. 70 dB (BW = 20 kHz)	min. 70 dB (BW = 20 kHz)

Audio specification for headphone:

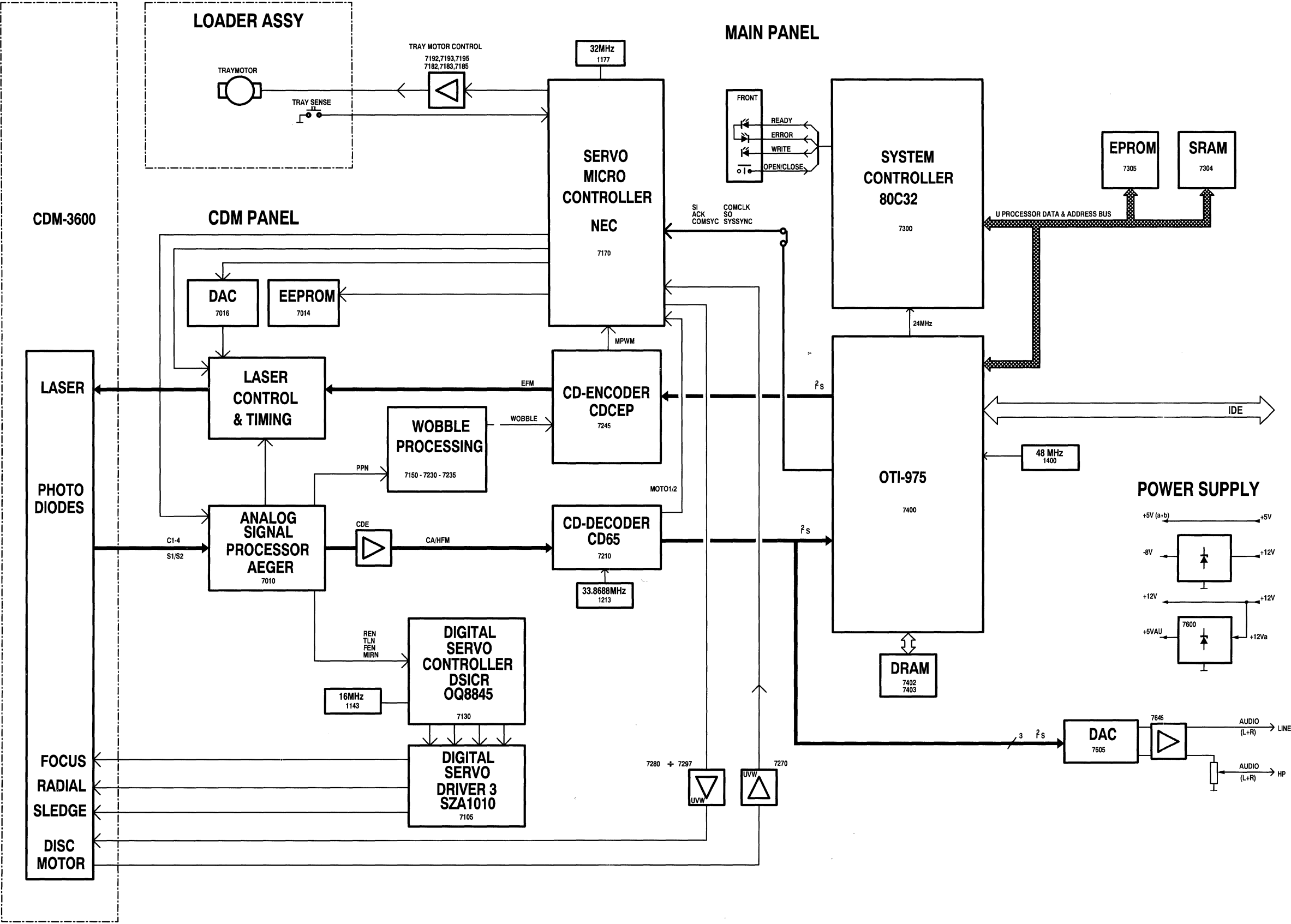
	On pressed CD	On recordable CD
Output Voltage (max volume)	3.1 V rms	3.1 V rms
Unbalance	max 0.25 dB	max 0.25 dB
Output Impedance	120 Ω	120 Ω
Amplitude Linearity	1.5 dB (20 Hz - 20 kHz)	2.5 dB (20 Hz - 16 kHz)
S/N-ratio	81 dB (84 dB A-wtg)	80 dB (82 dB A-wtg)
Total Harmonic Distortion + Noise	60 dB	45 dB
Outband attenuation	min. 50 dB above 25 kHz	min. 50 dB above 25 kHz
Channel separation	min. 67 dB (20 kHz)	min. 65 dB (16 kHz)
Muting level during random access	min. 60 dB (BW = 20 kHz)	min. 60 dB (BW = 20 kHz)

LIST OF ABBREVIATIONS

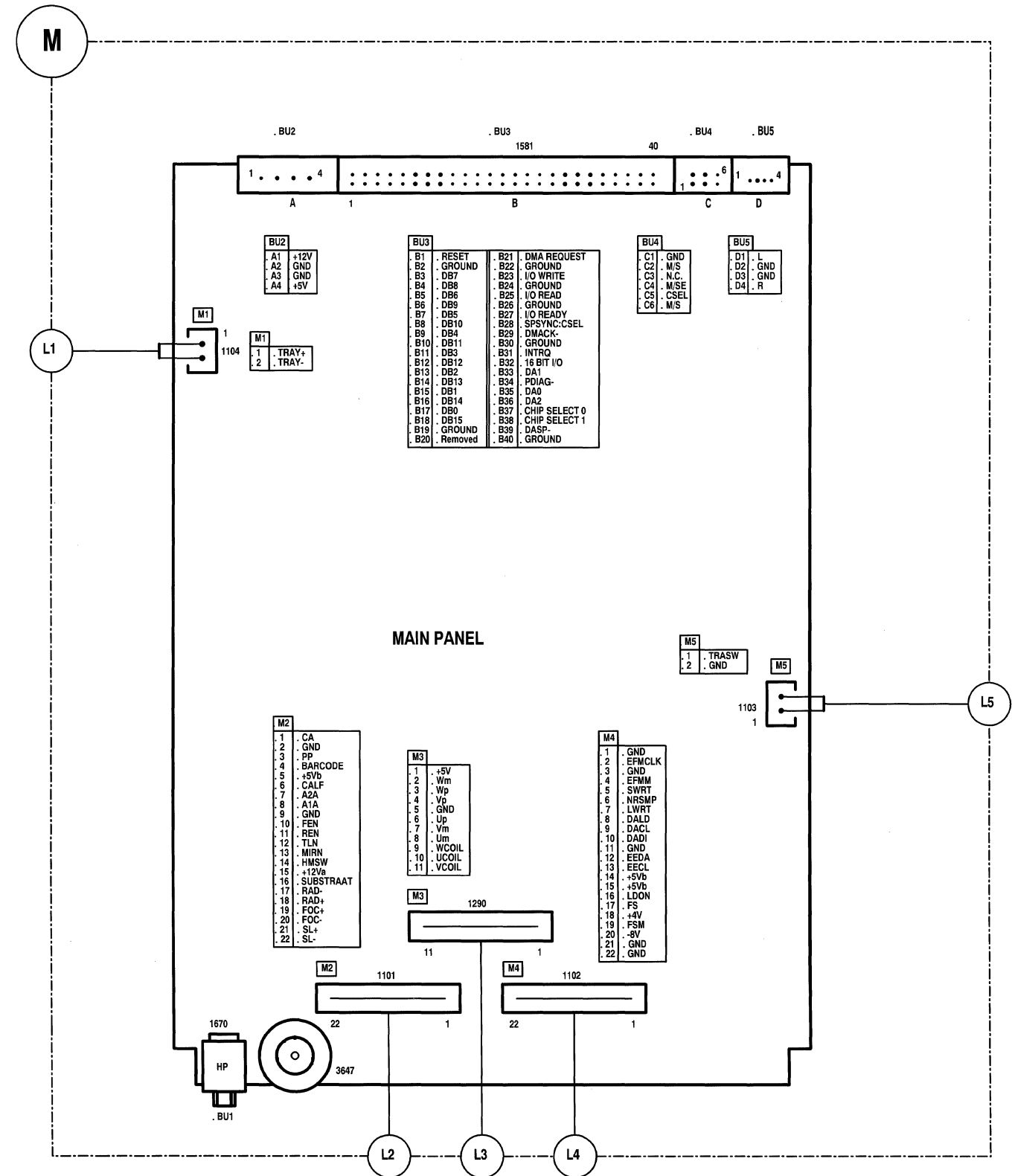
975CSN	μC chip select
975INTN	μC interrupt
A1A - A2A	HF envelopes
ACK	Acknowledge serial communication user μP
AD0 ... 7	Multiplexed address/data lines out μP
ARSTN	ATAPI reset
CA	Central Aperture (C1+C2+C3+C4) DC → for Mod. calculation
CALF	CA low frequency
CAS0N	DRAM column address strobe 0
CDE	CD erase
CE_INT	CDCEP interrupt
CFLG	Correction flag output (CD60)
CL11	11 Mhz from decoder
CL16	16 Mhz from decoder
CLCE	μC clock output encoder (CDCEP)
CLDE	μC clock output decoder (CD60)
CLDS	μC clock output decoder (CD60)
CLOUT	I ² S bitclock output (CD60)
CLWP	μC clock Atip information CDCEP
COMCLK	Communication clock from user μP
COMSYNC	Communication synchronisation from user μP
CS1FXN	IDE select lines
CS3/SCLK	IDE select line
CSEL	Cable select M/S
DACDA	DAC data
DACE	μC data I/O CPCEP
DACL	DAC clock
DADE	μC data CDLIP
DADI	DAC data in (CDM)
DADS	μC data I/O DSICR
DAIN	Data signal (CDCEP)
DALD	DAC load (CDM)
DAOUT	I ² S data output (CD60)
DAWP	μC data Atip information (CDCEP)
EECL	EEPROM clock
EEDA	EEPROM data
EFM	Eight to fourteen modulation 2: CDCEP output for monitoring (reduced voltage from CD60 to MONON)
EFMCLK	EFM clock 4.3218 or 8.6436 MHz
EFMM	EFM N-1
EFOUT	Error flag output CDROM (CD60)
EGINTN	μC interrupt
EJECTN	Eject signal
FEN	Focus error normalized = $(C1 + C3 - C2 - C4) / (C1 + C2 + C3 + C4)$
FEOFS	Focus error offset
FLASHCSN	Flash chip select
FOC+, FOC-	Focus actuator
FS	FS=FSO-DALFA (write power to laser control)
FSM	Focused sense monitor
HA0 ... 2	Host address
HALL_U, V, W	Hall element U, V, W of motor
HD0 ... 15	Host data bus
HDACK/DACKN	ATAPI host DMA acknowledge
HDASPN	Drive active/Drive 1 present
HDRQ/DREQ	ATAPI host DMA request
HIRQ/SIRQN	ATAPI host interrupt
HMSW	Home switch
HPDIAGN	Passed diagnostics
HRD/DBRDN	Host read strobe
HRSTN	Host hardware reset
HWR/DBWRN	Host write strobe
IOCS16N	Drive 16-bit I/O
IORDY	Host I/O ready
KILL	Audio mute at startup
LDCE	μC load input (from CDCEP)

LDDE	μC load output decoder
LDDS	μC load output DSICR
LDON	Laser diode on (on read)
LED0 ... 2	LED on
LWRT	Laser at writing power
M/S	Master/Slave selection
MCK/2	Master clock ÷ 2 to μP 80C32
MCLK	Bit clock output (CDCEP)
MIRN	Mirror normalized
MISO	Master in slave out
MONON	Monitoring EFM from CDCEP to CD60
MOSI	Master output/slave in serial data communications
MOTO1	Control signal for motor
MPWM	Motor puls width modulation
MRST	Master reset
MUTE	Audio mute
N2, N4	N=high (double speed)
NCLOSE	Tray close
NIRQ	Interrupt request wobble processing (CDCEP)
NOPEN	Tray open
NRSMP	None read sample (active low) during EFM
OTD	Off track detection DISCR
PP	XB or PPN (read or write)
PROGRAM	Controlline to program FLASH
PRSTN	Power on reset
PSENN	Program store enable output
PWM	Puls width modulation
RAD+, RAD-	Radial actuator
RAD0 ... 9	RAM address bus
RADINT	Radial actuator integrator voltage
RASN	Row address DRAM
RD0 ... 7	RAM data bus
REN	Radial error normalized
RENSW	REN switch
RESEN	Reset CDCEP from μP
RESET	Reset from μP to DSICR and CD6
ROEN	DRAM output enable
RSTIN	Reset micro controller (from user)
RWEN	DRAM write enable
SCSICSN	SCSI chip select, not relevant
SL+, SL-	Sledge motor
SRAMCSN	SRAM chip select
SWRT	Start write 9msec (one shot at start up LWRT)
SYSSYNC	System synchronization interrupt
TLN	Track loss normalized
TRS1N	Tray switch
UA0 ... 17D	μC NON multiplexed address bus
UALE	μC address latch enable
URDN	μC read strobe
URDNX	μC read strobe
US2, VS2, WS2	Motordriver controllines
UWRN	μC write strobe
V4	Subcode data
VREFM	Motordriver reference voltage
WCLK	Word clock
WSENC	Word select output from encoder (master) CDCEP
WSENC D	WSENC delayed
WSOUT	Word select out

OVERALL BLOCKDIAGRAM CDD3610



The diagram illustrates the internal layout of the CDM 3600 Panel. A large rectangular frame represents the panel's boundary. Inside, a smaller rectangle is labeled "CDM 3600 PANEL". Within this inner panel, a dashed rectangle contains a dashed circle, labeled "CDM 3600". Above the inner panel, the word "TRAY" is written. To the left of the tray, a circular component labeled "TRAY MOT" is connected to a terminal block labeled "M1". Below the inner panel, three vertical lines extend downwards, each ending in a terminal block labeled "M2", "M3", and "M4" respectively. To the right of the inner panel, a terminal block labeled "M5" is connected to the panel's outer boundary. The entire diagram is enclosed in a dashed line, with a circular terminal labeled "L" at the top left.



Main PCB

- Block Diagram
- Schematic Diagrams
- PCB Layout

Chapter 2

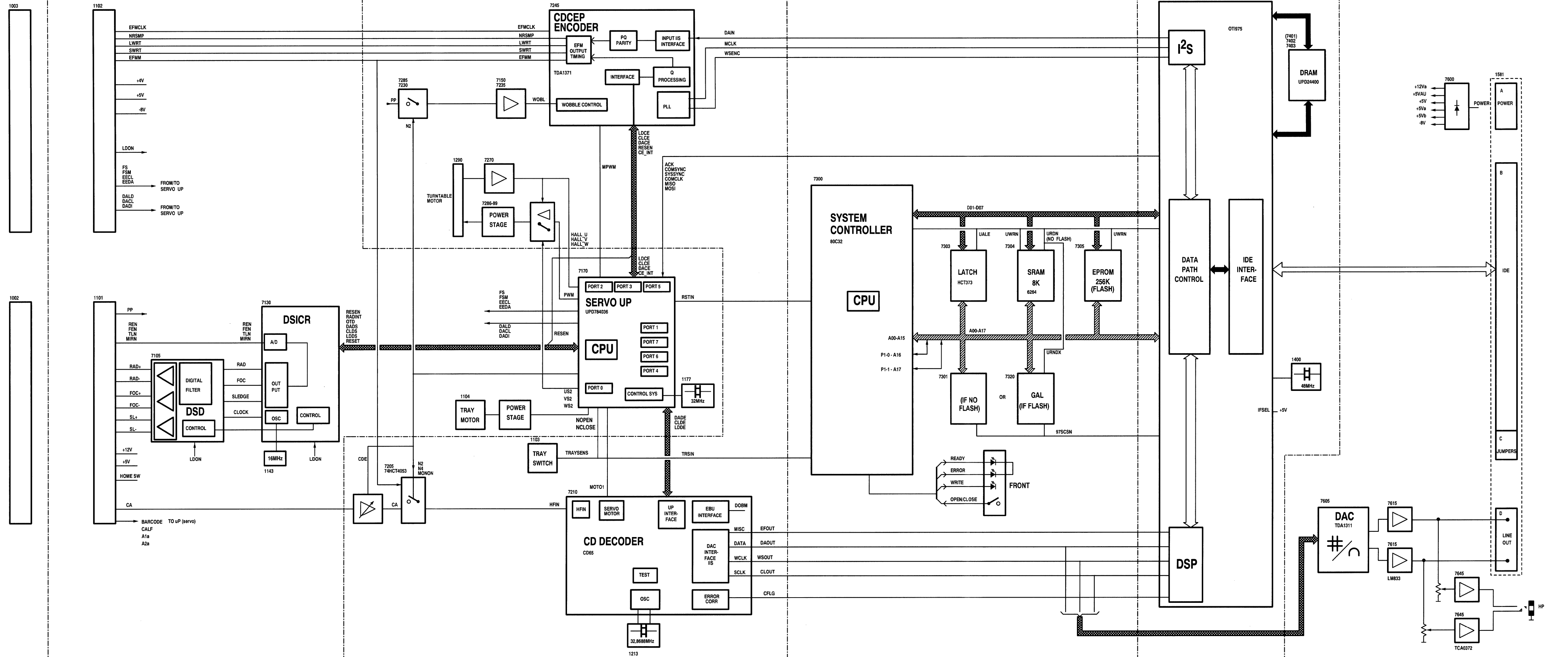
1 SERVO PART

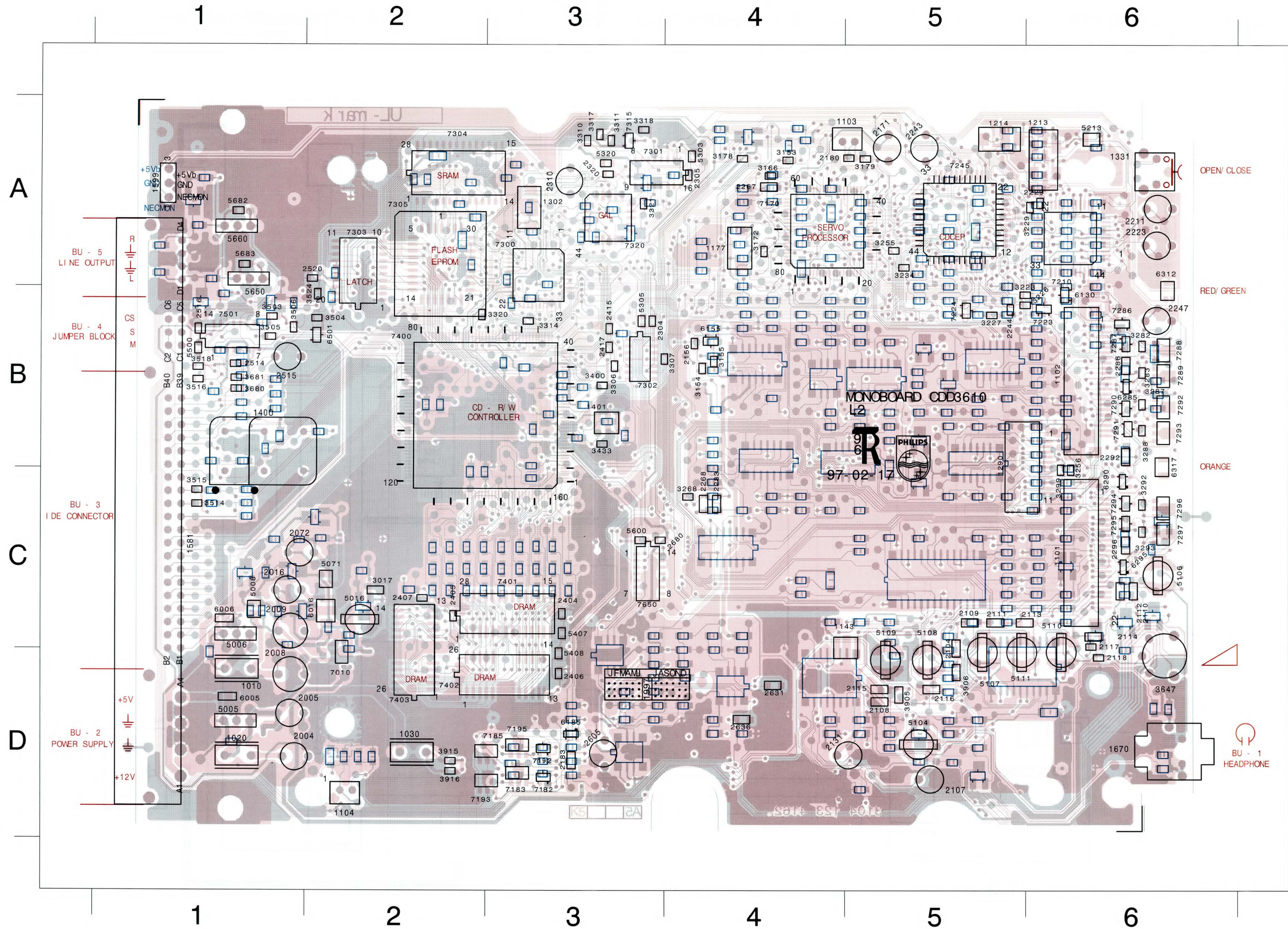
2 CD ENCODING & DECODING PART

3 SYSTEM CONTROLLER PART

4 BLOCKENCODING/DECODING
AND IDE PART

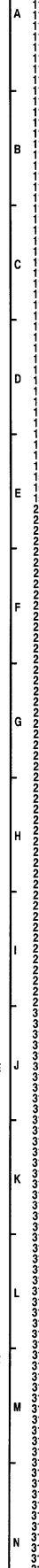
5 POWER & AUDIO OUT



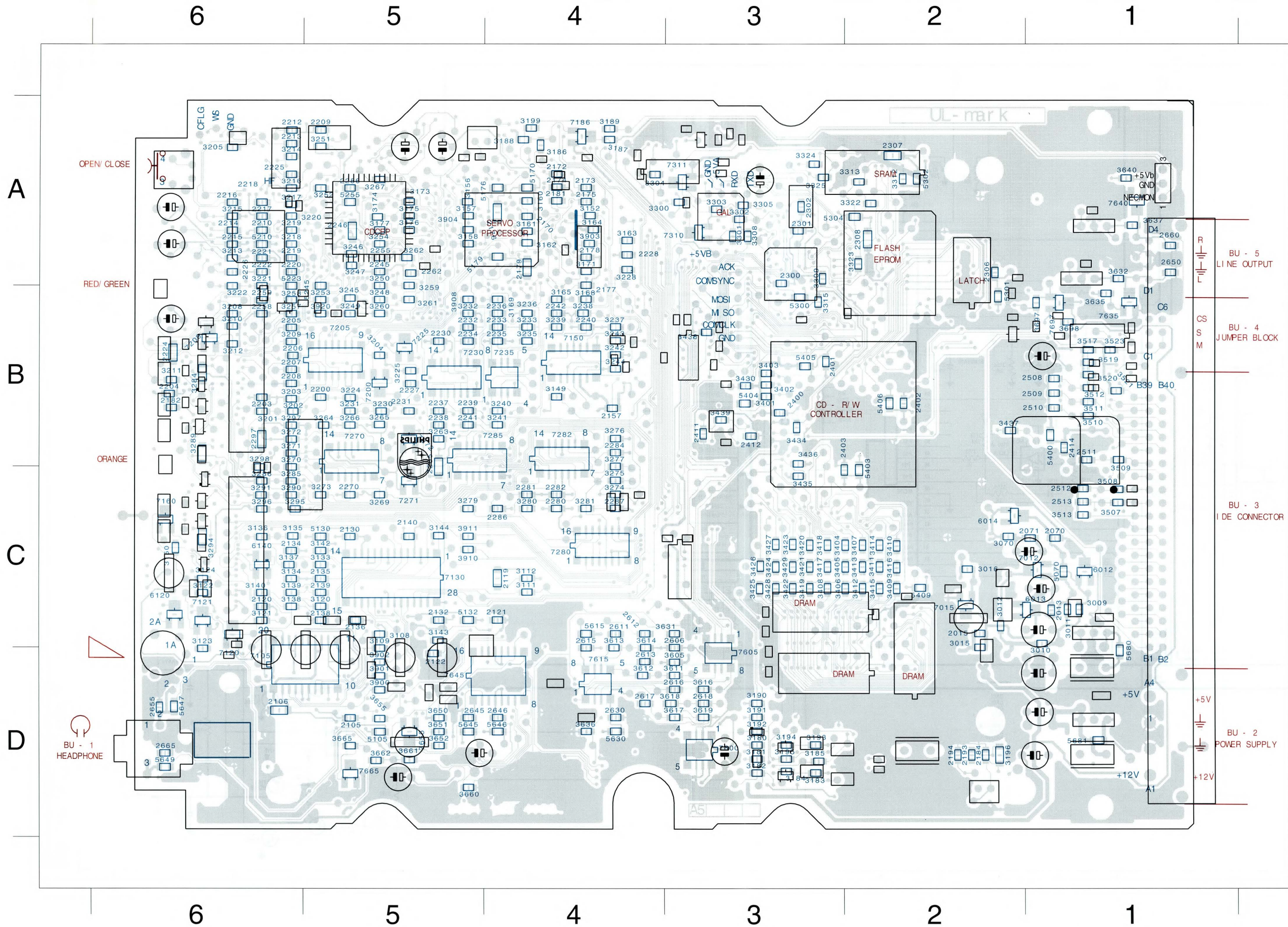


1010 D 1	2520 A 2	5303 A 4
1020 D 1	2605 D 3	5305 B 3
1030 D 2	2631 D 4	5320 A 3
1101 C 6	2636 D 4	5407 C 3
1102 B 6	2680 C 3	5408 D 3
1103 A 5	3017 C 2	5500 B 1
1104 D 2	3153 A 4	5600 C 3
1143 C 5	3154 B 4	5650 A 1
1177 A 4	3155 B 4	5660 A 1
1213 A 6	3166 A 4	5682 A 1
1214 A 5	3172 A 4	5683 A 1
1290 B 6	3178 A 4	6005 D 1
1302 A 3	3179 A 5	6006 C 1
1331 A 6	3223 B 5	6016 C 2
1400 B 1	3226 B 5	6130 B 6
1401 B 3	3227 B 5	6155 B 4
1581 C 1	3229 A 6	6185 D 3
1599 A 1	3234 A 5	6285 B 6
1670 D 6	3255 A 5	6290 C 6
2004 D 1	3256 C 6	6295 C 6
2005 D 1	3268 C 4	6312 B 6
2008 D 1	3282 B 6	6317 B 6
2009 C 1	3283 B 6	6501 B 2
2016 C 1	3287 B 6	7010 D 2
2072 C 1	3288 B 6	7170 A 4
2104 C 5	3292 C 6	7182 D 3
2107 D 5	3293 C 6	7183 D 3
2108 D 5	3299 C 6	7185 D 3
2109 C 5	3306 B 3	7192 D 3
2110 C 6	3307 B 4	7193 D 3
2111 C 5	3310 A 3	7195 D 3
2112 C 6	3311 A 3	7210 A 6
2113 C 5	3314 B 3	7223 B 6
2114 C 6	3317 A 3	7224 B 5
2115 D 5	3318 A 3	7245 A 5
2116 D 5	3320 B 2	7286 B 6
2117 C 6	3321 A 3	7287 B 6
2118 D 6	3400 B 3	7288 B 6
2131 D 5	3433 B 3	7289 B 6
2156 B 4	3503 B 1	7290 B 6
2171 A 5	3504 B 2	7291 B 6
2180 A 5	3505 B 1	7292 B 6
2183 D 3	3506 B 1	7293 B 6
2211 A 6	3514 C 1	7294 C 6
2223 A 6	3515 C 1	7295 C 6
2229 A 6	3516 B 1	7296 C 6
2243 A 5	3518 B 1	7297 C 6
2244 B 5	3524 B 2	7300 A 3
2247 B 6	3647 D 6	7301 A 3
2267 A 4	3680 B 1	7302 B 3
2268 C 4	3681 B 1	7303 A 2
2283 C 4	3905 D 5	7304 A 2
2288 B 6	3906 D 5	7305 A 2
2292 B 6	3915 D 2	7315 A 3
2296 C 6	3916 D 2	7320 A 3
2304 B 3	5005 D 1	7400 B 3
2305 A 4	5006 C 1	7401 C 3
2310 A 3	5008 C 1	7402 D 3
2320 A 3	5016 C 2	7403 D 2
2404 C 3	5071 C 2	7501 B 1
2405 C 2	5104 D 5	7650 C 3
2406 D 3	5106 C 6	
2407 C 2	5107 D 5	
2415 B 3	5108 D 5	
2417 B 3	5109 D 5	
2514 B 1	5110 D 6	
2515 B 1	5111 D 5	
2516 B 1	5213 A 6	

A vertical scale with labels A, B, C, D, E, F, G, H, I, J, K, L, M, and N. Each label is positioned to the left of a horizontal tick mark on a vertical line.



101	D1
101	D1
101	F1
101	E1
101	E1
101	F1
101	D1
101	G1
101	H1
101	H1
101	I1
102	J1
102	K1
102	K1
102	K1
102	K1
102	L1
102	L1
102	L1
102	M1
102	M1
102	M1
102	N1
102	N1
102	N1
102	N1
103	J30
144	K30
177	G23
179	C23
180	G23
181	G23
182	G23
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300	G23

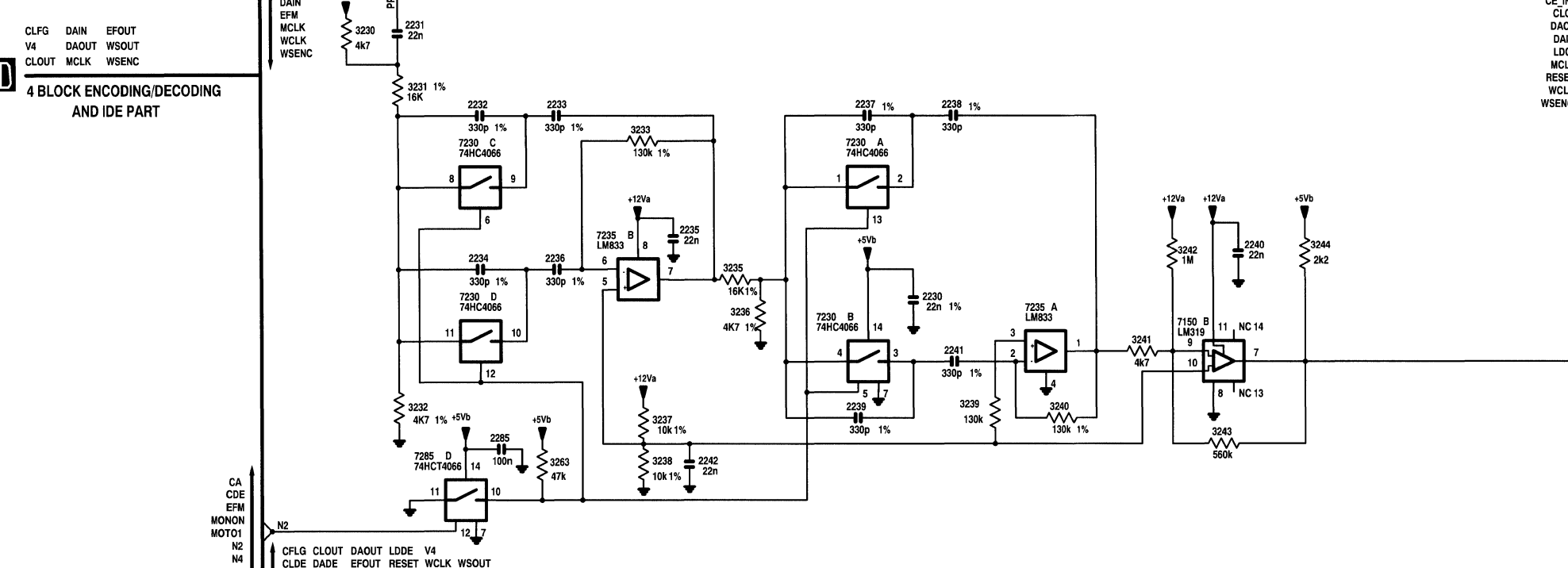


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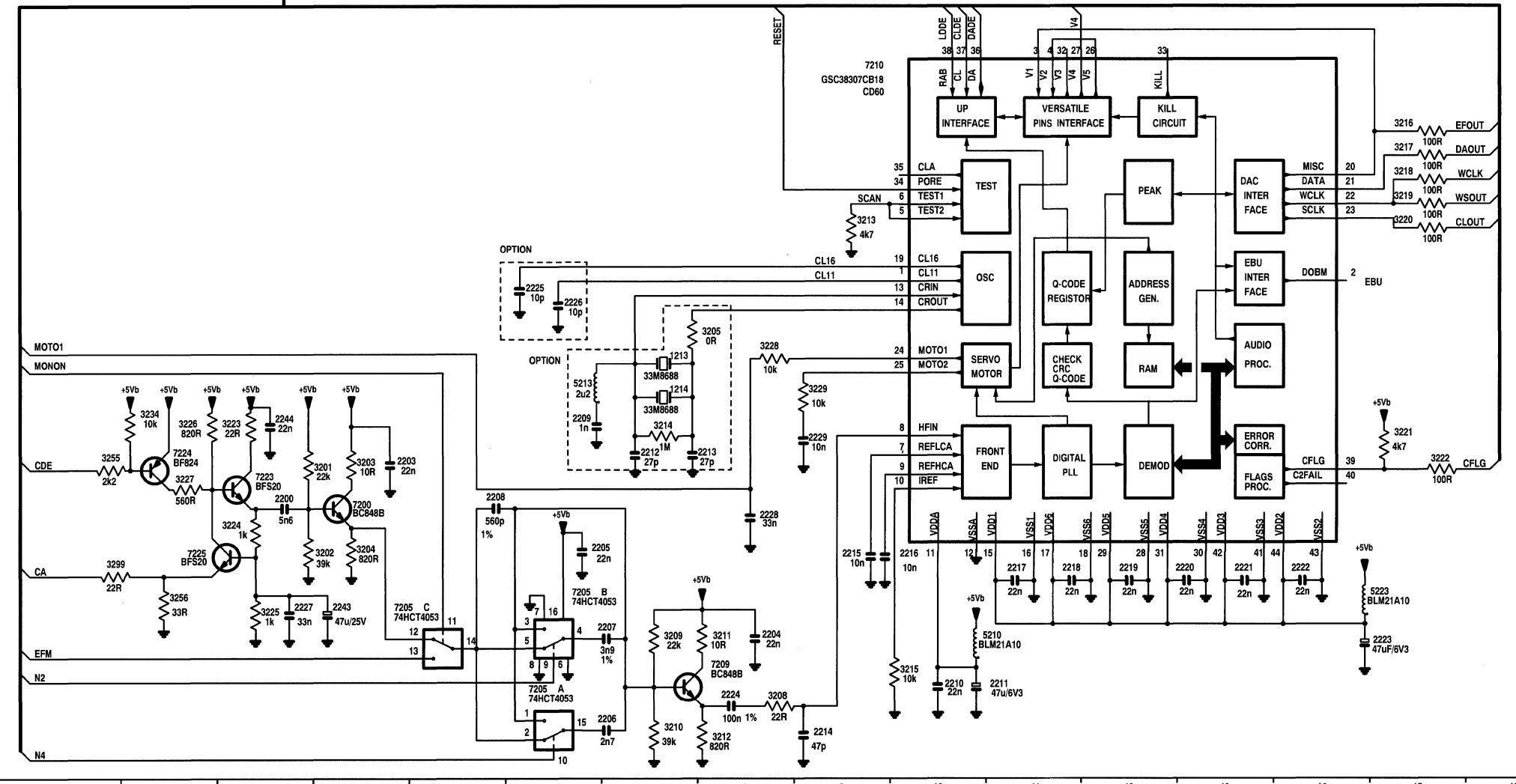
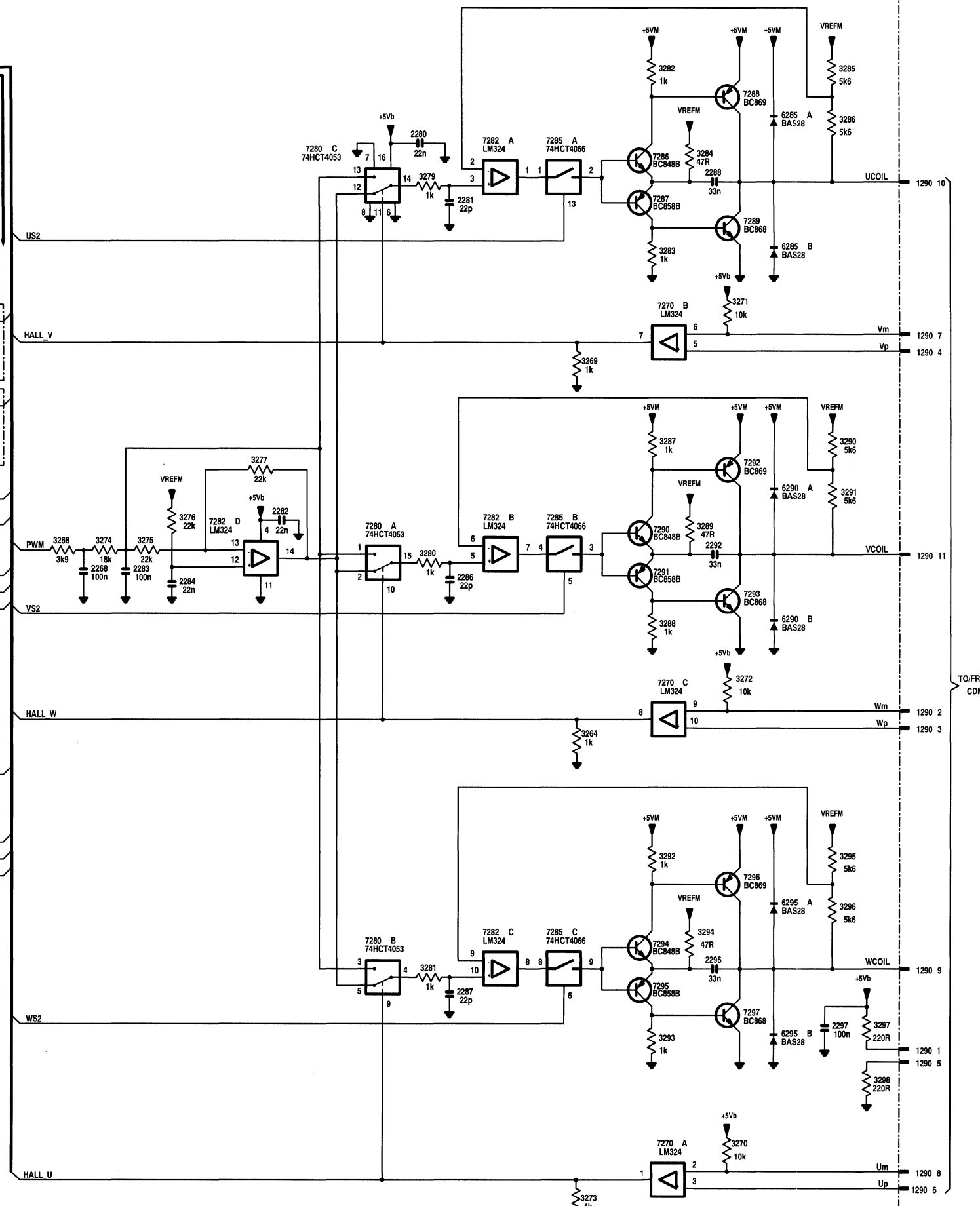
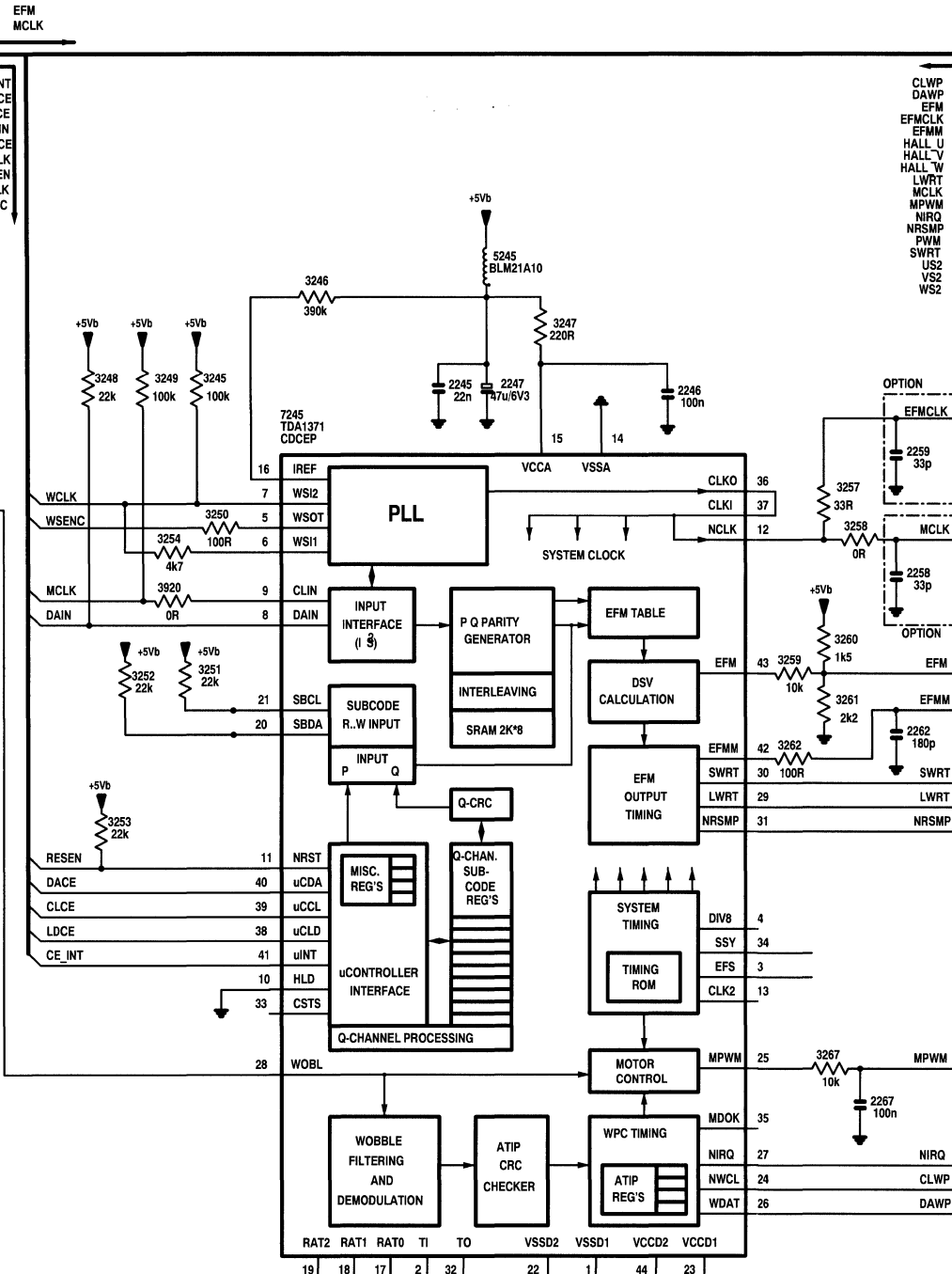
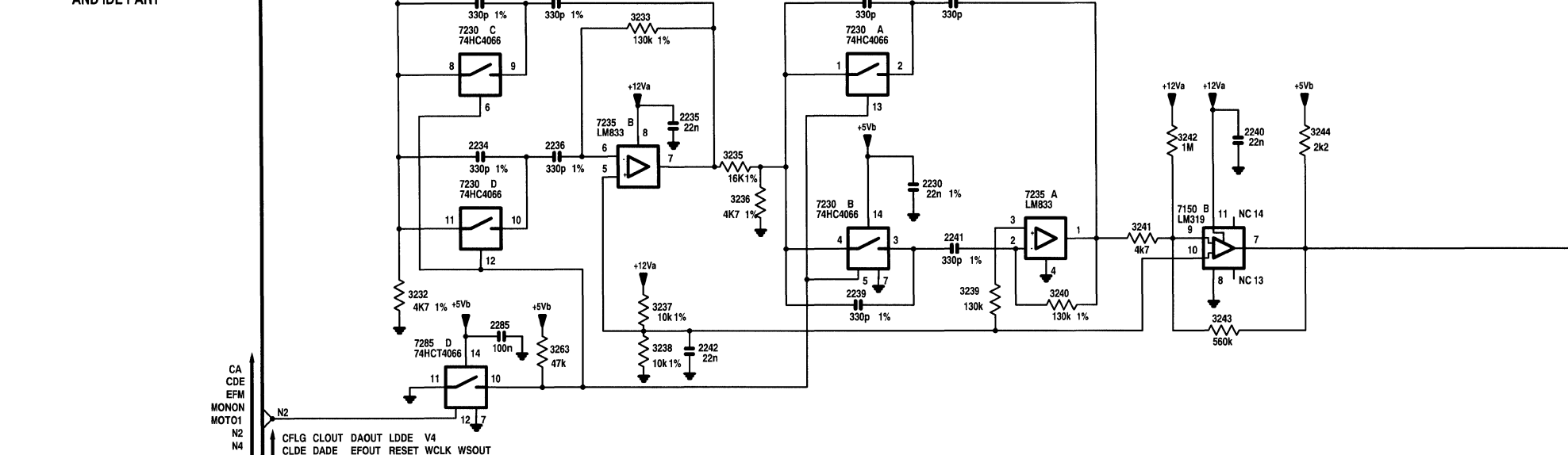
2 CD ENCODING & DECODING PART

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CDE	DADE	HALL_W	MPWM	PWM
CE_INT	DAWP	LDCE	N2	RESEN
CLCE	EFMCLK	LDDE	N4	RESET
CLDE	EFMM	LWRT	NIQ	SWRT
CLWP	HALL_U	MONON	NRSMP	US2

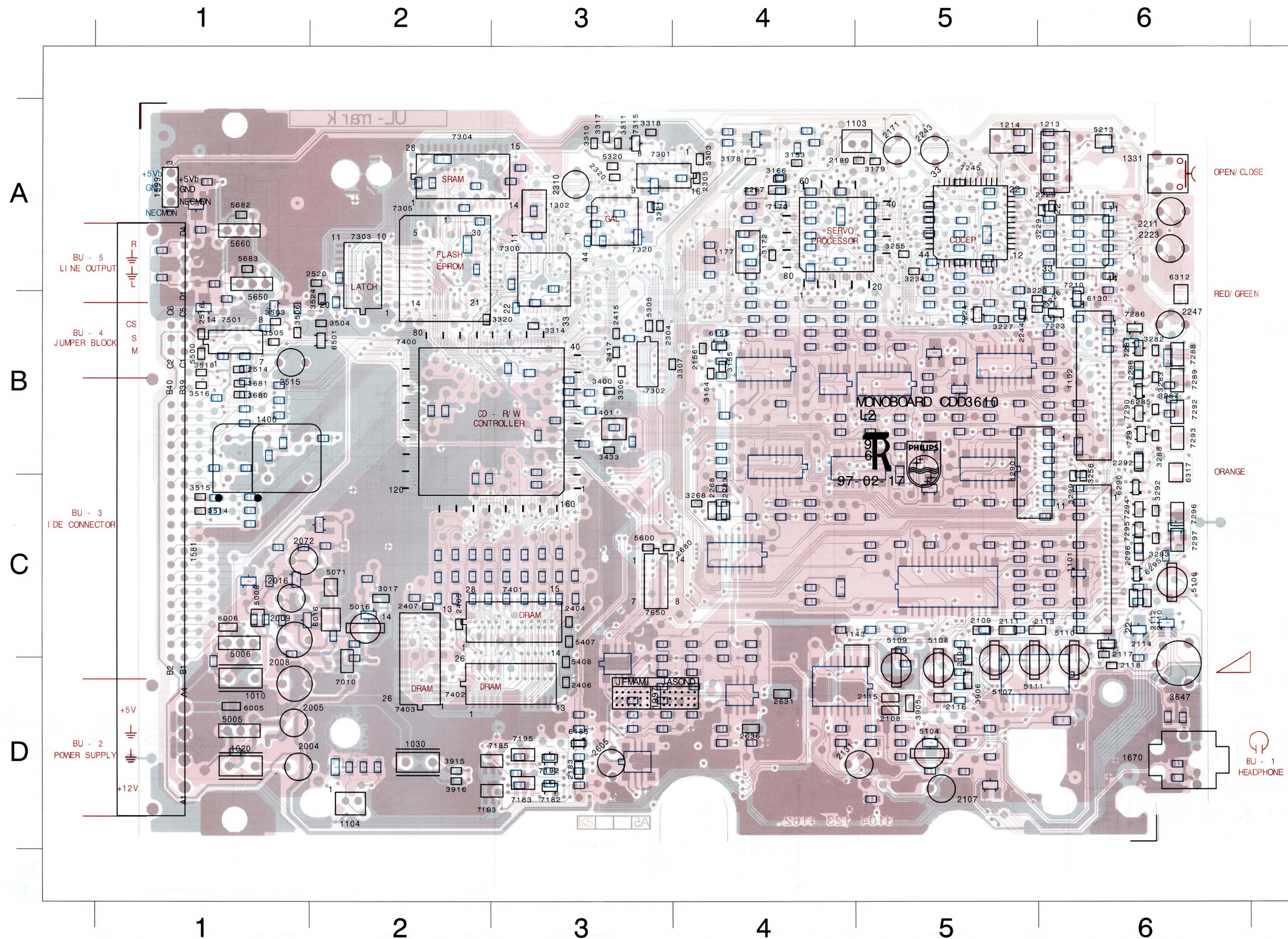
1 SERVO PART



4 BLOCK ENCODING/DECODING AND IDE PART



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	1281	F5	3292	G22
	1282	F5	3293	G22
	1290	J5	3293	M24
	1291	F5	3294	G22
A	1292	M5	3295	K4
	1293	F5	3296	L4
	1294	F5	3297	M24
	1295	F5	3298	L4
	1296	F5	3299	M14
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	1400	B 1	3226	B 5	6130	B 6
	1401	B 3	3227	B 5	6155	B 4
	1581	C 1	3229	A 6	6185	D 3
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	1670	D 6	3255	A 5	6290	C 6
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	2008	D 1	3282	B 6	6317	B 6
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	2109	C 5	3306	B 3	7192	D 3
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	2114	C 6	3317	A 3	7224	B 5
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	2116	D 5	3320	B 2	7286	B 6
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	2118	D 6	3400	B 3	7288	B 6
	2131	D 5	3433	B 3	7289	B 6
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	2415	B 3	5108	D 5		
	2417	B 3	5109	D 5		
	2514	B 1	5110	D 6		
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3 SYSTEM CONTROLLER PART

1 SERVO PART

4 BLOCK ENCODING / DECODING AND IDE PART

4 BLOCK ENCODING /
DECODING AND IDE PART

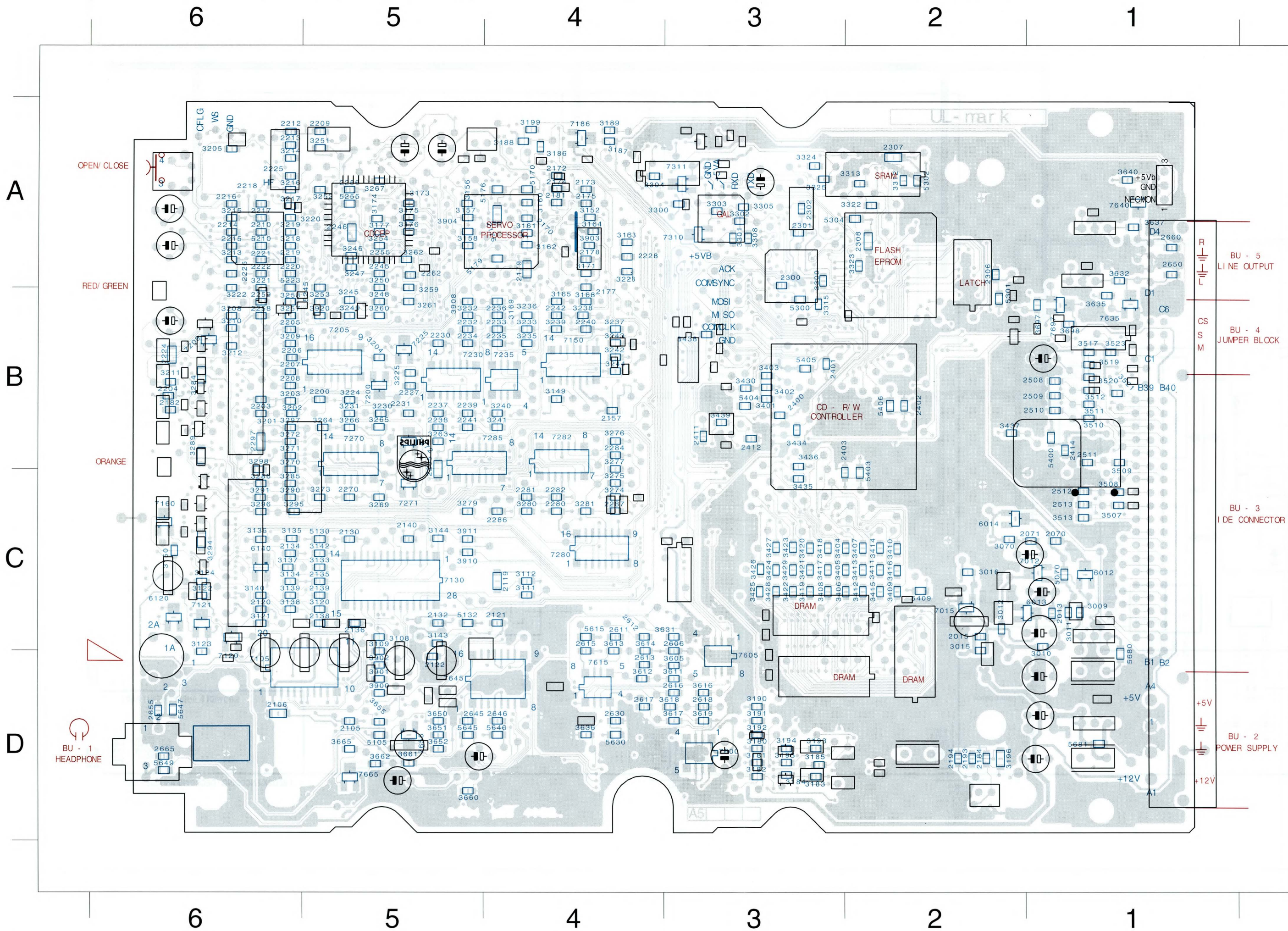
- Ⓐ Mounted when FLASH ROM used
Ⓑ Mounted when ROM used

5 POWER & AUDIO OUTPUT PART

4 BLOCK ENCODING / DECODING AND IDE PART

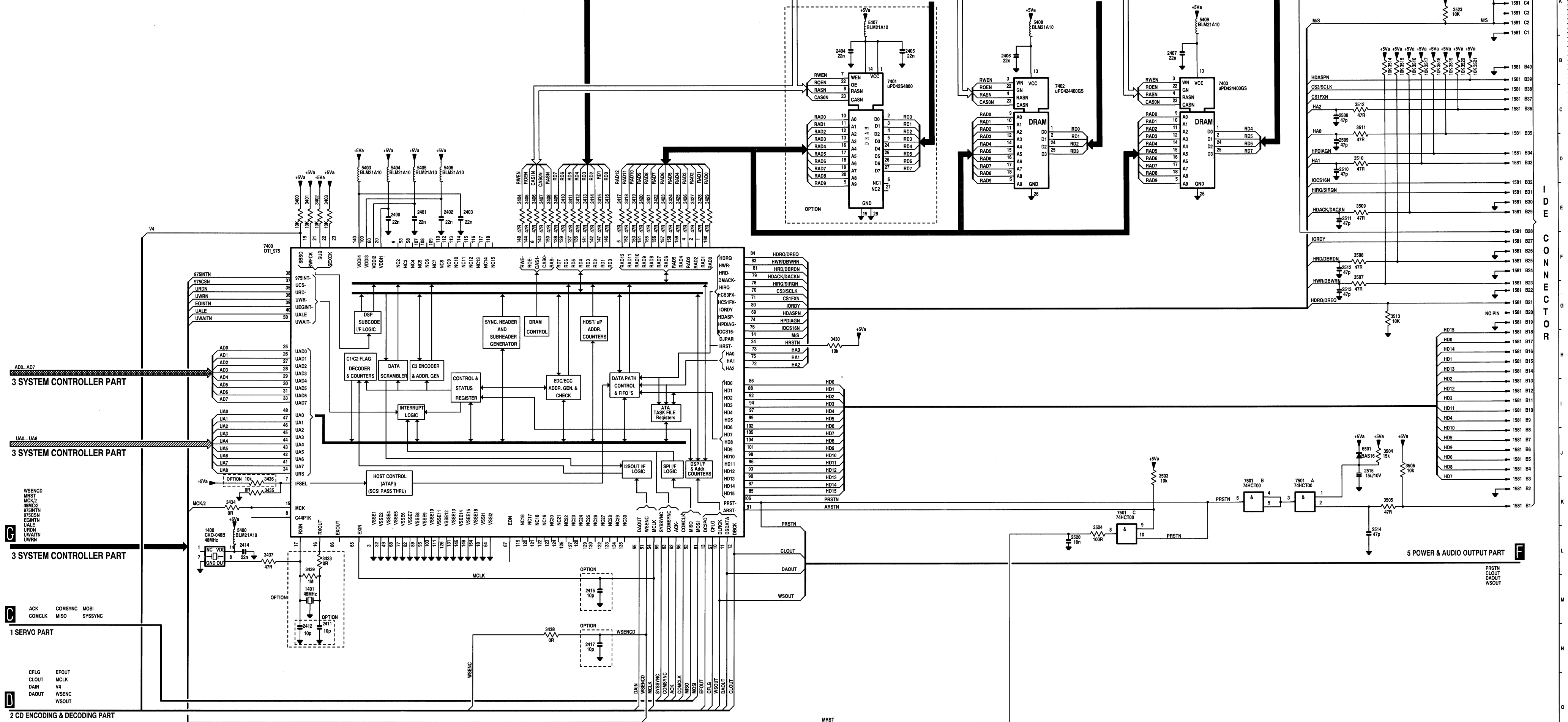
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3304 J3
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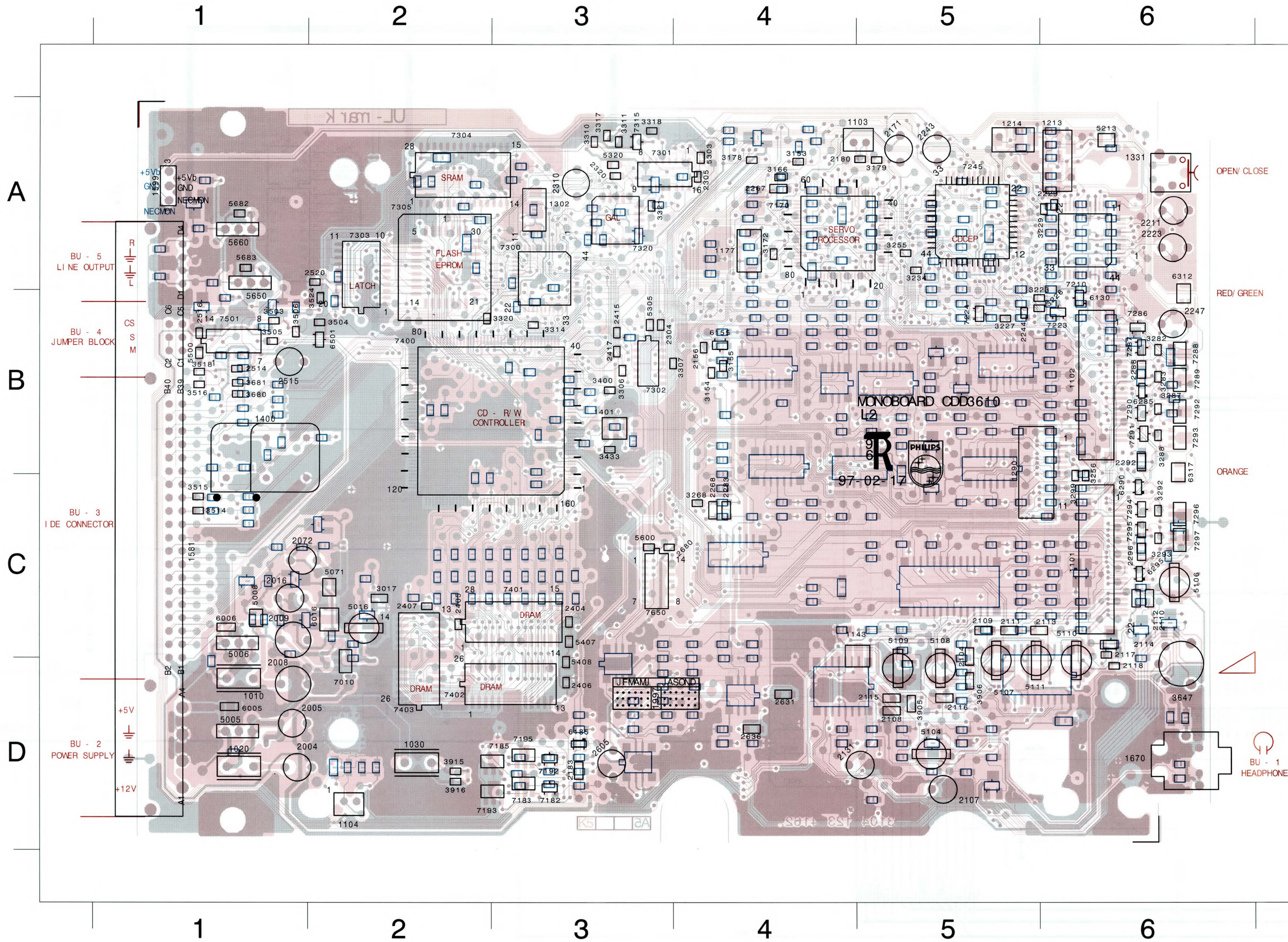
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2218 A 6	2611 C 4	3176 A 5	3247 A 5	3403 B 3	3637 A 1	7121 C 6	
2219 A 6	2612 C 4	3177 A 5	3248 B 5	3404 C 2	3640 A 1	7130 C 5	
2220 A 6	2613 D 4	3180 D 3	3249 B 5	3405 C 2	3650 D 5	7150 B 4	
2221 A 6	2615 D 4	3181 D 3	3250 A 5	3406 C 2	3651 D 5	7160 C 6	
2222 A 6	2616 D 3	3182 D 3	3251 A 5	3407 C 2	3652 D 5	7186 A 4	
2224 B 6	2617 D 4	3183 D 3	3252 A 5	3408 C 3	3655 D 5	7200 B 5	
2225 A 6	2618 D 3	3184 D 3	3253 B 5	3409 C 2	3660 D 5	7205 B 5	
2226 A 6	2630 D 4	3185 D 3	3254 A 5	3410 C 2	3661 D 5	7209 B 6	
2227 B 5	2645 D 5	3186 A 4	3257 B 6	3411 C 2	3662 D 5	7225 B 5	
2228 A 4	2646 D 4	3187 A 4	3258 B 6	3412 C 2	3665 D 5	7230 B 5	
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4 BLOCKENCODING/DECODING AND IDE PART



IDE CONNECTOR

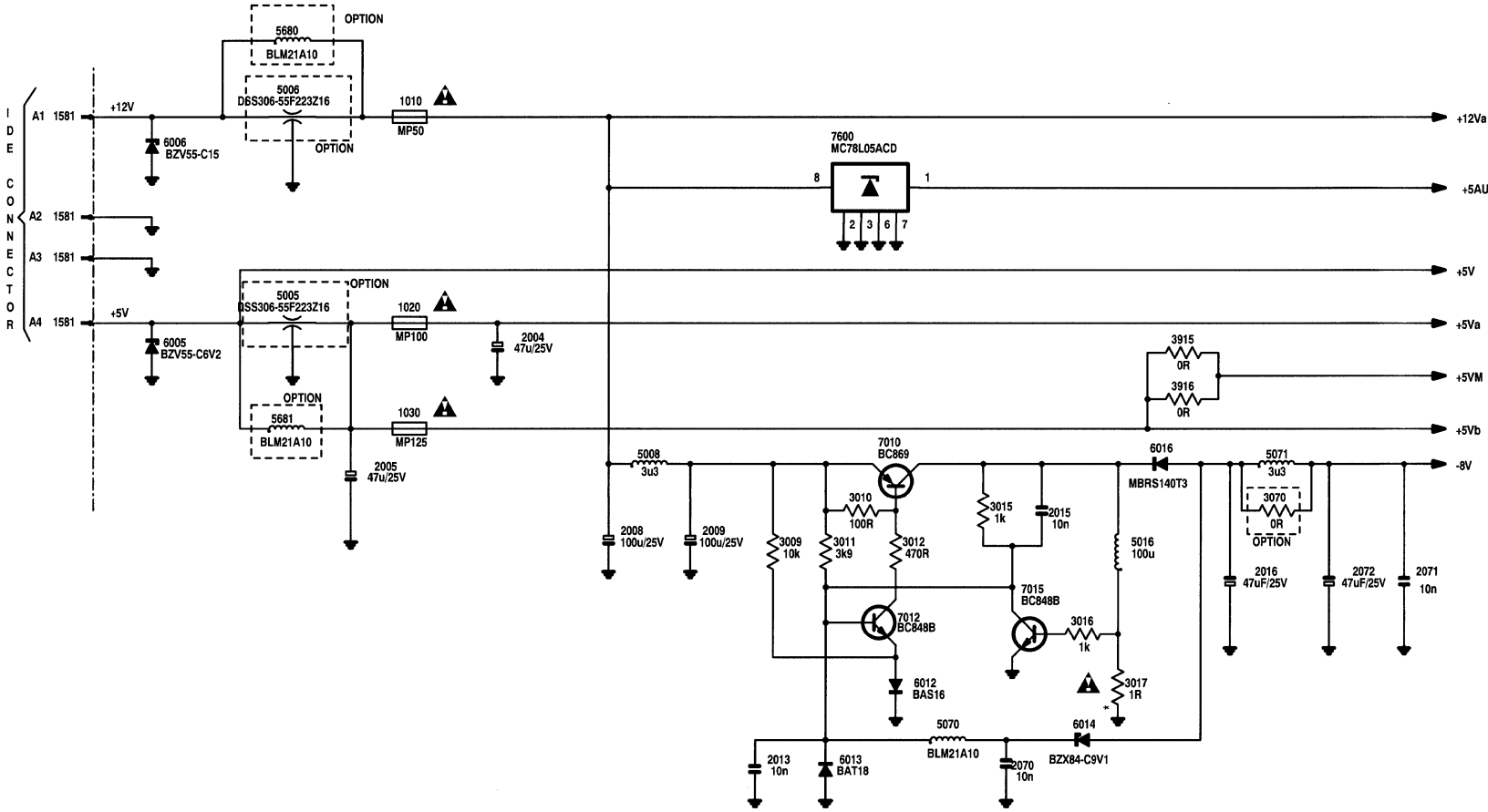
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1403	L5
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1492	L5
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1494	L5
1495	L5
1496	L5
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1498	L5
1499	L5
1500	L5



5 POWER & AUDIO OUTPUT PART

4 CD ENCODING/DECODING AND IDE PART

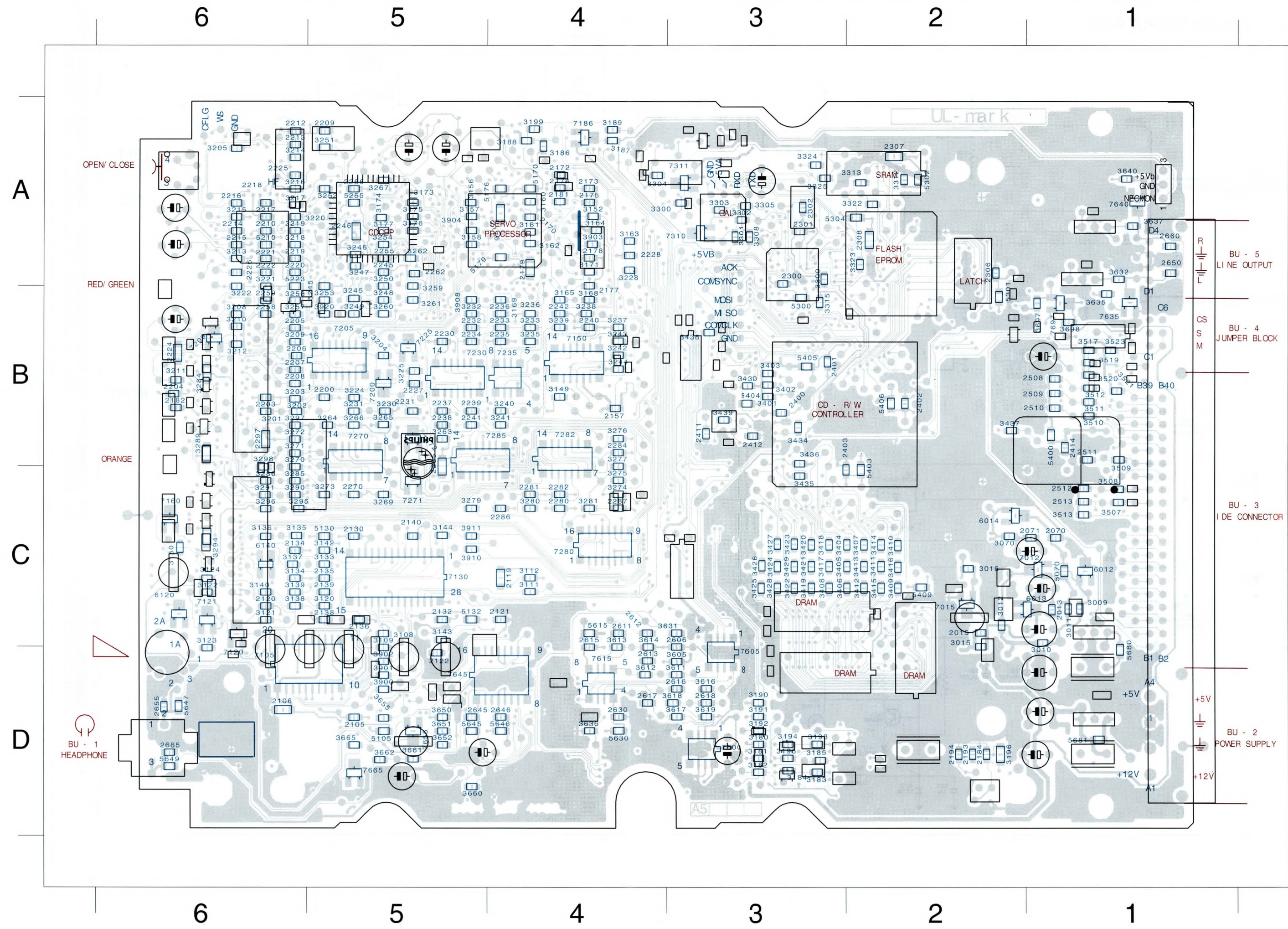
3 SYSTEM CONTROLLER PART



LEFT

RIGHT

1010 H 4
1020 J 4
1030 K 4
1581 H 1
1581 I 1
1581 J 1
1581 B 20
1581 C 20
1581 G 20
1581 F 20
1670 D 20
1670 H 20
2004 J 5
2005 K 4
2008 L 5
2009 L 7
2013 N 7
2015 L 10
2016 L 11
2070 N 9
2071 L 13
2072 L 12
2516 F 5
2605 C 10
2606 C 10
2611 A 14
2612 B 12
2613 C 13
2615 C 14
2616 F 11
2617 G 13
2618 E 13
2630 G 14
2631 C 15
2636 B 18
2636 C 18
2636 G 15
2637 F 18
2640 G 18
2647 C 16
2647 H 16
2650 E 16
2651 E 17
2652 C 18
2655 D 18
2660 I 6
2661 I 7
2662 H 18
2665 H 18
2680 E 6
2681 F 6
2687 B 6
2688 C 6
2689 J 3
2690 H 3
2691 K 3
2692 J 2
2693 I 2
2694 M 8
2695 N 8
2696 K 8
2697 M 8
2698 L 9
2699 F 4
2700 H 9
2701 F 3
2702 C 8
2703 B 13
2705 C 19
2706 G 19
2707 G 16
2708 C 17
2709 E 6
2710 F 7
2711 F 8
2712 F 9
2713 D 19
2714 C 7



2013 C 1	2231 B 5	2655 D 6	3189 A 4	3260 B 5	3414 C 2	3698 B 1	7270 B 5
2015 C 2	2232 B 5	2660 A 1	3190 D 3	3261 B 5	3415 C 2	3900 D 5	7271 C 5
2070 C 1	2233 B 4	2665 D 6	3191 D 3	3262 A 5	3416 C 2	3901 D 5	7272 B 5
2071 C 1	2234 B 5	3009 C 1	3192 D 3	3263 B 5	3417 C 3	3902 D 5	7280 C 4
2105 D 5	2235 B 4	3010 C 1	3193 D 3	3264 B 5	3418 C 3	3903 A 4	7282 B 4
2106 D 6	2236 B 4	3011 C 1	3194 D 3	3265 B 5	3419 C 3	3904 A 5	7285 B 5
2119 C 4	2237 B 5	3012 C 2	3195 D 3	3266 B 5	3420 C 3	3908 B 5	7310 A 3
2120 C 6	2238 B 5	3015 D 2	3196 D 2	3267 A 5	3421 C 3	3910 C 5	7311 A 3
2121 C 4	2239 B 5	3016 C 2	3199 A 4	3269 C 5	3422 C 3	3911 C 5	7600 D 3
2122 D 5	2240 B 4	3070 C 2	3201 B 6	3270 C 6	3423 C 3	3920 B 5	7605 D 3
2130 C 5	2241 B 5	3108 C 5	3202 B 6	3271 B 6	3424 C 3	5070 C 1	7615 D 4
2132 C 5	2242 B 4	3109 D 5	3203 B 6	3272 B 6	3425 C 3	5105 D 5	7635 B 1
2134 C 6	2245 A 5	3111 C 4	3204 B 5	3273 C 5	3426 C 3	5130 C 5	7640 A 1
2135 C 5	2246 A 5	3112 C 4	3205 A 6	3274 C 4	3427 C 3	5132 C 5	7645 D 4
2136 C 5	2255 A 5	3120 C 5	3208 B 6	3275 C 4	3428 C 3	5170 A 4	7655 D 5
2138 C 5	2256 A 5	3121 C 6	3209 B 6	3276 B 4	3429 C 3	5176 A 4	7665 D 5
2139 C 5	2258 B 6	3122 C 6	3210 B 6	3277 C 4	3430 B 3	5179 A 4	7697 B 1
2140 C 5	2259 B 6	3123 D 6	3211 B 6	3279 C 5	3434 B 3	5210 A 6	
2157 B 4	2262 A 5	3124 C 6	3212 B 6	3280 C 4	3435 C 3	5223 A 6	
2170 A 4	2270 C 5	3133 C 5	3213 A 6	3281 C 4	3436 B 3	5245 A 5	
2172 A 4	2280 C 4	3134 C 6	3214 A 6	3284 B 6	3437 B 2	5255 A 5	
2173 A 4	2281 C 4	3135 C 6	3215 A 6	3285 C 6	3438 B 3	5300 B 3	
2174 A 4	2282 C 4	3136 C 6	3216 A 6	3286 C 6	3439 B 3	5301 B 2	
2175 A 4	2284 B 4	3137 C 6	3217 A 6	3289 B 6	3507 C 1	5302 A 2	
2176 A 4	2285 C 5	3138 C 6	3218 A 6	3290 C 6	3508 C 1	5304 A 2	
2177 A 4	2286 C 4	3139 C 6	3219 A 6	3291 C 6	3509 B 1	5400 B 1	
2178 A 4	2287 C 4	3140 C 6	3220 A 6	3294 C 6	3510 B 1	5403 C 2	
2179 A 4	2297 B 6	3142 C 5	3221 A 6	3295 C 6	3511 B 1	5404 B 3	
2181 A 4	2300 A 3	3143 C 5	3222 A 6	3296 C 6	3512 B 1	5405 B 3	
2182 B 6	2301 A 3	3144 C 5	3224 B 5	3297 B 6	3513 C 1	5406 B 2	
2184 D 2	2302 A 3	3149 B 4	3225 B 5	3298 C 6	3517 B 1	5409 C 2	
2193 D 2	2306 A 2	3150 C 6	3228 A 4	3300 A 3	3519 B 1	5615 C 4	
2194 D 2	2307 A 2	3152 A 4	3230 B 5	3301 A 3	3520 B 1	5630 D 4	
2200 B 5	2308 A 2	3156 A 5	3231 B 5	3302 A 3	3521 B 1	5645 D 5	
2203 B 6	2400 B 3	3157 A 5	3232 B 5	3303 A 3	3523 B 1	5646 D 4	
2204 B 6	2401 B 3	3158 A 5	3233 B 4	3304 A 4	3605 D 3	5647 D 6	
2205 B 6	2402 B 2	3160 A 4	3235 B 4	3305 A 3	3611 D 3	5649 D 6	
2206 B 6	2403 C 2	3161 A 4	3236 B 4	3308 A 3	3612 D 4	5680 D 1	
2207 B 6	2411 B 3	3162 A 4	3237 B 4	3309 A 3	3613 D 4	5681 D 1	
2208 B 6	2412 B 3	3163 A 4	3238 B 4	3312 A 2	3614 D 4	6012 C 1	
2209 A 5	2414 B 1	3164 A 4	3239 B 4	3313 A 2	3616 D 3	6013 C 1	
2210 A 6	2508 B 1	3165 B 4	3240 B 4	3315 B 3	3617 D 3	6014 C 2	
2212 A 6	2509 B 1	3168 B 4	3241 B 4	3322 A 2	3618 D 3	6120 C 6	
2213 A 6	2510 B 1	3169 B 4	3242 B 4	3323 A 2	3619 D 3	6140 C 6	
2214 A 6	2511 B 1	3171 A 4	3243 B 4	3324 A 3	3631 C 3	7012 C 1	
2215 A 6	2512 C 1	3173 A 5	3244 B 4	3325 A 3	3632 A 1	7015 C 2	
2216 A 6	2513 C 1	3174 A 5	3245 B 5	3401 B 3	3635 B 1	7105 D 5	
2217 A 6	2606 D 3	3175 A 5	3246 A 5	3402 B 3	3636 D 4	7120 C 6	
2218 A 6	2611 C 4	3176 A 5	3247 A 5	3403 B 3	3637 A 1	7121 C 6	
2219 A 6	2612 C 4	3177 A 5	3248 B 5	3404 C 2	3640 A 1	7130 C 5	
2220 A 6	2613 D 4	3180 D 3	3249 B 5	3405 C 2	3650 D 5	7150 B 4	
2221 A 6	2615 D 4	3181 D 3	3250 A 5	3406 C 2	3651 D 5	7160 C 6	
2222 A 6	2616 D 3	3182 D 3	3251 A 5	3407 C 2	3652 D 5	7186 A 4	
2224 B 6	2617 D 4	3183 D 3	3252 A 5	3408 C 3	3655 D 5	7200 B 5	
2225 A 6	2618 D 3	3184 D 3	3253 B 5	3409 C 2	3660 D 5	7205 B 5	
2226 A 6	2630 D 4	3185 D 3	3254 A 5	3410 C 2	3661 D 5	7209 B 6	
2227 B 5	2645 D 5	3186 A 4	3257 B 6	3411 C 2	3662 D 5	7225 B 5	
2228 A 4	2646 D 4	3187 A 4	3258 B 6	3412 C 2	3665 D 5	7230 B 5	
2230 B 5	2650 A 1	3188 A 4	3259 A 5	3413 C 2	3697 B 1	7235 B 4	

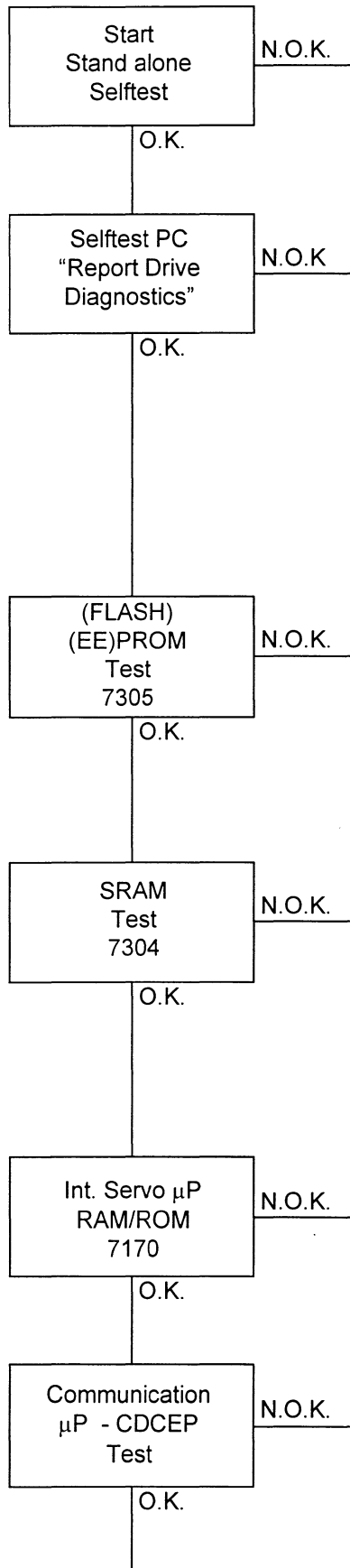
CDM3600 PCB
- Block Diagram

Chapter 3

Quick Diagnostics Chart
Selftest
Measurements on Monopanel

Chapter 4

QUICK DIAGNOSTICS CHART



Check: ■ Open/Close key (1331)
■ Connections I/O Port 1 (7300)
■ Proceed "Report Diagnostics"

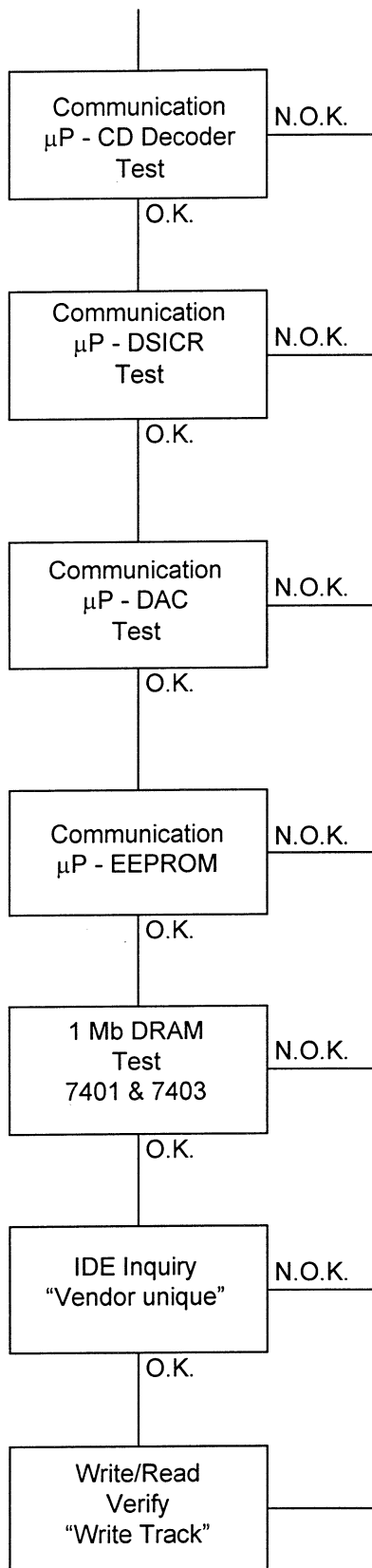
Check: ■ IDE connector (1581)
■ 48 MHz clock (1400)
■ Reset line: PRSTN
■ IDE interface (7400)
- Control + status lines
- Data lines HD0 ÷ HD15
- Address lines HA0 ÷ HA2
- Selection lines CS0, CS1
- Jumper settings M/S, CS
■ Main μProcessor (7300)
- Clock (1302)
- Reset line MRST

Check: ■ (EE)PROM (7305)
- Address lines UA0 ÷ UA15
- Address lines UA16 ÷ UA17
- Data lines AD0 ÷ AD7
- Control lines UWRN, CE/OE
■ Main μProcessor (7300)
- PSENN
- EAN

Check: ■ SRAM (7304)
- Control lines URWN, URDN(X), CS
- Data lines AD0 ÷ AD7
- Address lines UA0 ÷ UA7
- Address lines UA13 ÷ UA14
■ LATCH (7403)
- Address lines UA0 - UA7
- Data lines AD0 - AD7
- Control line UALE

Check: ■ Servo μP (7107)
- Reset line RSTIN (pin 7)
- Clock (1177) 32MHz
- ASTB (pin 44)

Check: ■ Servo μP (7107) - CDCEP (7245)
- DACE (μP interface - I/O port 4,6)
- CLCE
- LDCE
- CLWP (WPC Timing - I/O port 1, 6)
- DAWP
- NIRQ



Check: ■ Servo μ P (7107) - CD Decoder (7210)
 - DADE (μ P interface - I/O port 4, 6)
 - CLDE
 - LDDE

Check: ■ Servo μ P - DSICR servo controller (7130)
 - LDDS (μ P interface - I/O port 4, 6)
 - DADS
 - CLDS

Check: ■ Servo μ P (7170) - DSICR servo controller (7130)
 - DALD (μ P interface - I/O port 4, 6)
 - DACL
 - DADI

Check: ■ Servo μ P (7170)
 - EEDA
 - EECL

Check: ■ DRAM (7401 - 7402)
 - Address lines RAD00 ÷ RAD09
 - Data lines RD0 ÷ RD03
 - Data lines RD04 ÷ RD07
 - Control lines RWEN, ROEN, RASN, CASN

Check: ■ Communication μ P ↔ IDE controller
 ■ Communication μ P ↔ EEPROM
 ■ IDE connector/cable
 ■ IDE controller

AUTO SELFTEST

EXECUTION

- ◆ The auto selftest will execute a number of diagnostic tests and will be activated by pushing and holding Open/Close button for one complete Open/Close cycle of the tray.
- ◆ The auto selftest can also be executed by holding the Open/Close button for about 4 seconds during power-up.
- ◆ At Host command: Send REPORT DRIVE DIAGNOSTICS command.

VISIBLE EFFECTS

- ◆ The disc-in LED and the write LED will be tested before the actual selftest:
 - The disc-in LED will flash three times: The first time RED, the second time GREEN and the last time ORANGE.
 - The write LED will flash ORANGE.This is repeated once.
- ◆ The selftest can be issued by the host via the REPORT DRIVE DIAGNOSTICS command.
- ◆ During execution of a particular test 0, the right LED is ORANGE. After execution of this test, the right LED will flash a number of times.
If this part of the test failed, then the LED will flash RED a number of times. The number of flashes, corresponds to the sequence number of the test.

Example: Execution of test number 4

- ◆ disc-in LED is ORANGE
→ Test 4 is being executed
- ◆ disc-in LED flashes 4 times GREEN
→ Test 4 is successful executed

OR

- ◆ disc-in LED flashes 4 times RED
→ Test 4 failed
- ◆ After completion of the whole test, a final indication of the testresults will be given: The LED will flash GREEN-ORANGE for about 3 seconds if the test is successful. Otherwise, the LED will be RED until a new command has to be executed.

INDIVIDUAL TESTS

Selftest 1: ROM test

During this test, both the common area's and the banked area's are tested. The common area-test reads data out of the common area of one bank and compares this data with the data of the other banks. The test is successful if the tested parts of all the banks contain the same information.

Selftest 2: External SRAM test

The test checks that the SRAM is in correct working order: access every address, write a number of patterns, and verify that what was written, is also correctly read again.

Selftest 3: Not available

Selftest 4: Basic Engine test

The correct working of the Basic Engine is checked during this test.
The tested parts are: ROM, RAM, Encoder communication path, Decoder communication path, Servo IC Communication, DAC, and EEPROM.

Selftest 5: DRAM test

During the DRAM test, the data cache page (lowest 819 kB) will be tested. The rest of the DRAM will not be tested because the test has to be non-destructive and the upper DRAM addresses contain system critical information. The DRAM test also consists of 2 subtests:

Test of the 8 lowest address lines:

This test is the same as the test of the lowest address lines of the SRAM.

Test of the complete data cache page:

For this test a block-length of less than 256 bytes is used: a block-length of 253 is used for filling the memory with a continuously incrementing value (i.e. blocks with the values 00 through FC).

Notes:

Detailed results of the diagnostics tests can be obtained via the menu on the PC screen (Service tool CDD3610).

Detailed results of the Basic Engine test can be retrieved via Basic Command "Request System Info".

Measurements on Mono Panel

1. Power supplies and loads

1. a. Check power supplies

Condition: loader attached

◆ Measure on fuse 1020 (+5a)	+5V ±5%
◆ Measure on fuse 1030 (+5b)	+5V ±5%
◆ Measure on fuse 1010 (+12a)	+12V ±5%
◆ Measure on connector 1102 pin 18 (+4)	+4V ±5%
◆ Measure across capacitor 2071 (-8)	-8V ±5%

1. b. Check load

Condition: loader attached, idle
measured with PM2521

◆ Measure current through connector 1581 pin A1 (+12V)	136 mA
◆ Measure current through connector 1581 pin A4 (+5V)	332 mA

2. Check key components

2. a. Check Servo Microcontroller (NEC784036, Item 7170)

◆ Measure voltage VDD at 7170 pin 8, 55	5V ±10%
◆ Measure voltage AVDD at 7170 pin 64	5V ±10%
◆ Measure voltage AVREF at 7170 pin 69, 65	5V ±10%
◆ Check clocksignal X1, X2 at 7170 pin 9 or 10	1V ±10%
	32 MHz 1%

2. b. Check CD Decoder (CD60, Item 7210)

◆ Measure voltage VDD at 7210 pin 15, 17, 29, 31, 42, 44	5V ±10%
◆ Measure voltage VDDA at 7210 pin 11	5V ±10%
◆ Check clocksignal CRIN at 7210 pin 13	4.7V ±10%
	33.8688 MHz ±1%
◆ Measure WSOUT, WCLK at 7210 pin 22	44.1 kHz ±1%
◆ Measure CLOUT at 7210 pin 23	2.11 MHz ±1%

2. c. Check CIRC/EFM Encoder (CDCEP, Item 7245)

◆ Measure voltage VCCD at 7245 pin 23, 44	5V ±10%
◆ Measure voltage VCCA at 7245 pin 15	4.7V ±30%
◆ Measure WSENC at 7245 pin 5	44.1 kHz 1%

2. d. Check Servo Controller (DSCIR, Item 7130)

◆ Measure voltage VDPA at 7130 pin 12	5V ±10%
◆ Measure voltage VDDD at 7130 pin 20	5V ±10%
◆ Check clocksignal at XTLO 7130 pin 18	> 1V
	16 MHz ±5%

2. e. Check Digital Powerstage (DSD2, Item 7105)

◆ Measure voltage VDD at 7105 pin 1, 13, 14	5V ±10%
◆ Measure voltage +5Vb at 7105 pin 6	5V ±10%
◆ Check clocksignal at 7105 pin 7	5Vtt ±10 %

2. f. Check User microprocessor 80C32 item 7300

◆ Measure voltage VCC pin 38	5V ±10%
◆ Check clocksignal XTAL1 on pin 15	24MHz ±1%
◆ Check reset RSTn pin 4	High if reset

2. g. Check datapath controller OTI-975 item 7400

◆ Measure voltage VDD1 pin 20	5V ±10%
◆ VDD2 pin 60	5V ±10%
◆ VDD3 pin 100	5V ±10%
◆ VDD4 pin 140	5V ±10%
◆ Check clocksignal RXIN on pin 17	48MHz
◆ Check reset PRST on pin 106	Low if reset

3. Communication between 80C32 microcontroller and FLASH

The FLASH (7305) contains the controller software.

Address decoding is performed by GAL16V8 (7320) which generates the necessary chip selects towards FLASH (7320 pin 19), SRAM (7320 pin 18) and OTI-975 (7320 pin 17) URDNX is also generated by the GAL on pin 12 and is used to read data from SRAM (low active).

Since the 80C32 architecture uses a multiplexed databus/lowest byte addressbus, the lowest 8 address lines are latched in 74HCT373 (7303) when UALE (Address Latch Enable) on 7303 pin 11 is low.

Address lines UA16 and UA17 are used for memory bankswitching.

FLASH EPROM timing

3. 1. FLASH read cycle

name	description	requirement	result
t_{RC}	Read cycle time	min. 90ns.	165ns.
t_{ACC}	Address to output delay	max. 90ns.	85ns.
t_{CE}	Chip enable to output delay	max. 90ns.	40ns.
t_{OE}	Output enable to output delay	max. 35ns.	45ns. *
t_{DF}	Chip enable to output high Z	max. 20ns.	35ns. *
t_{OH}	Output hold time from addresses CE or OE whichever occurs first	min. 0ns.	40ns. *
t_{LHLL}	ALEN pulse width	min. 43ns.	85ns.
t_{AVLL}	Address valid to ALEN low	min. 28ns.	40ns.
t_{PLPH}	PSENN pulse width	min. 104ns.	125ns.
t_{LLPL}	ALEN low to PSENN low	min. 28ns.	40ns.
t_{LLIV}	ALEN low to valid instruction in	max. 101ns.	85ns.
t_{PLIV}	PSENN low to valid instruction in	max. 79ns.	45ns.
t_{PXIX}	Input instruction hold after PSENN	min. 0ns.	40ns.
t_{AVIV}	Address to valid instruction in	max. 153ns.	125ns.

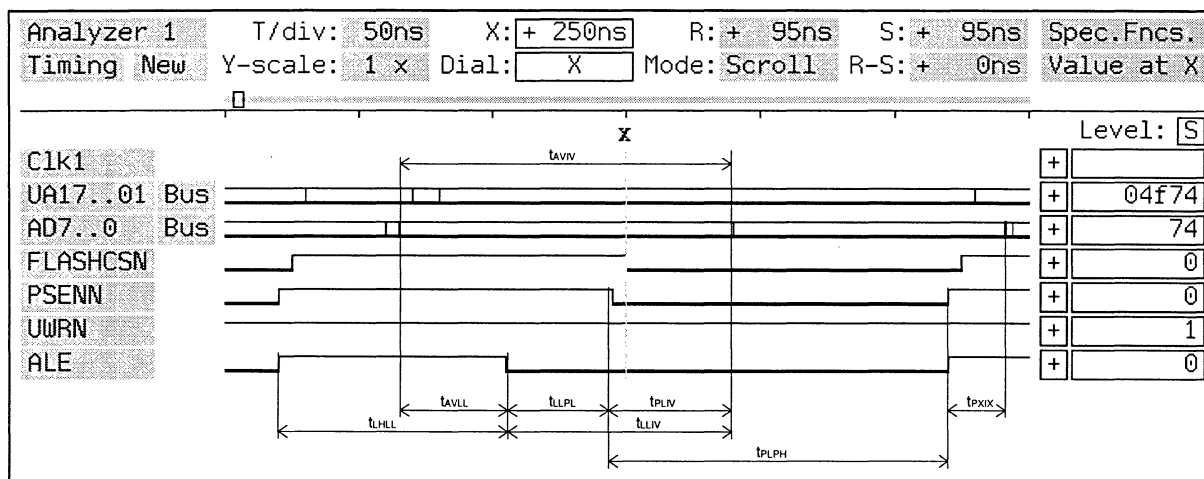
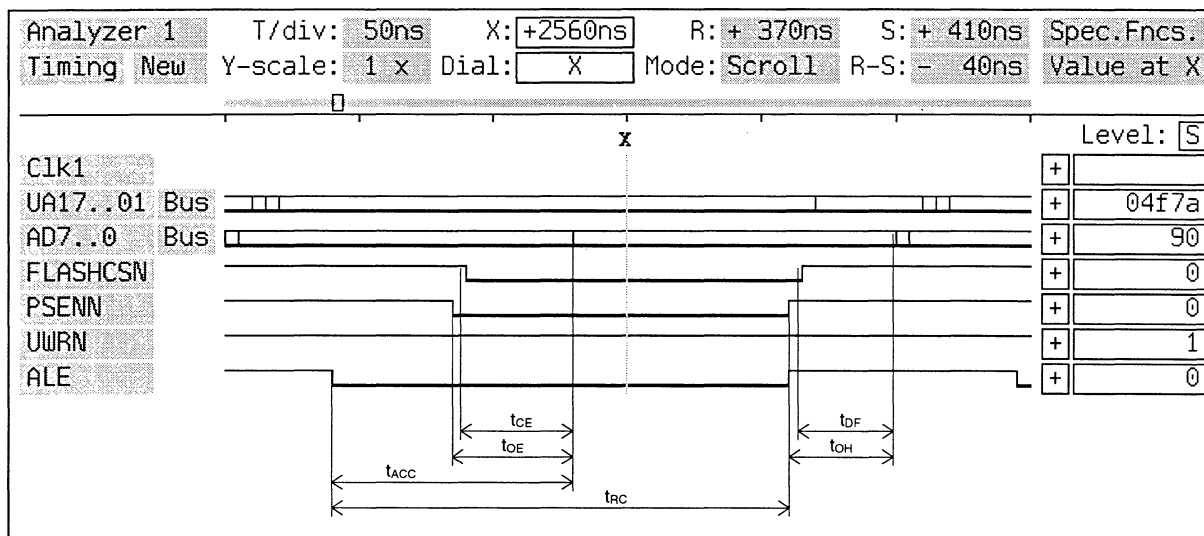
Notes:

* = Only when the minimum cycle time of 90ns is required these values must meet also the maximum or minimum requirements.

For the following figures:

Address =	UA17..01
Data output =	AD7..1
Output enable =	PSENN
Chip enable =	FLASHCSN
Write enable or WRN =	UWRN
Address latch =	ALEN

AU01 to UA07 are latched from the data-bus with ALEN. Address validity appears with falling edge of the ALEN signal.



3. 2. FLASH write cycle timing

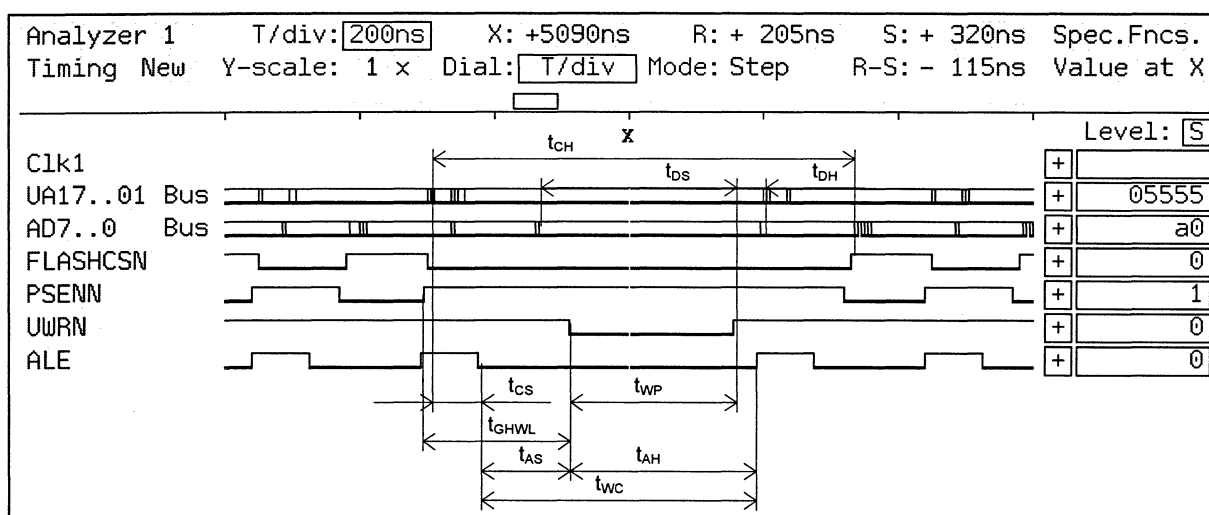
name	description	requirement	result
t_{WC}	Write cycle time	min. 90ns.	415ns.
t_{AS}	Address set-up time	min. 0ns.	135ns.
t_{AH}	Address hold time	min. 45ns.	280ns.
t_{DS}	Data setup time	min. 45ns.	290ns.
t_{DH}	Data hold time	min. 0ns.	40ns.
t_{GHWL}	Read recover time before write	min. 0ns.	215ns.
t_{CS}	Chip enable setup time	min. 0ns.	210ns.
t_{CH}	Chip enable hold time	min. 0ns.	175ns.
t_{WP}	Write pulse width	min. 45ns.	245ns.

Notes:

For the following figure:

Address = UA17..01
 Data output = AD7..1
 Output enable = PSENN
 Chip enable = FLASHCSN
 Write enable = UWRN
 Address latch = ALE

AU01 to UA07 are latched from the data-bus with ALE. Address validity appears with falling edge of the ALE signal.



4. Communication between OTI-975 (7400) and DRAM (7402/7403)

4. 1. Oak internal clock timing

The OTI-975 is running on an 48MHz external crystal. Internal clock timing is then as follows:

Internal clock period t_{PC} :	42ns.
Internal clock high t_{PCH} :	21ns.
Internal clock low t_{PCH} :	21ns.

As DRAM the NEC mPD424400-60ns 4M-bit dynamic RAM is used.
The DRAM is used in 4 modes:

- Read cycle (see figure "DRAM read cycle" on page 6).
- Fast page mode read cycle (see figure "DRAM late write cycle" on page 7).
- Late write cycle (seldom) (see figure "DRAM fast page mode read cycle" on page 7).
- Fast page mode late write cycle (see figure "DRAM fast page mode late write cycle" on page 7).

4. 2. Timing common to read, write cycle

name	description	requirement	result
t_{RC}	Read/write cycle time	min. 120ns.	125ns.
t_{RP}	RASN precharge time	min. 50ns.	60ns.
t_{CPN}	CASN precharge time	min. 10ns.	60ns.
t_{RAS}	RASN pulse width	min. 60ns. max. 10.000ns.	60ns.
t_{CAS}	CASN pulse width	min. 15ns. max. 10.000ns.	25ns.
t_{RSH}	RASN hold time	min. 20ns.	20ns.
t_{CSH}	CASN hold time	min. 60ns.	65ns.
t_{RCD}	RASN to CASN delay time	min. 20ns. max. 40ns.	40ns.
t_{RAD}	RASN to column address delay time	min. 15ns. max. 30ns.	30ns.
t_{CRP}	CASN to RASN precharge time	min. 10ns.	60ns.
t_{ASR}	Row address setup time	min. 0ns.	50ns.
t_{RAH}	Row address hold time	min. 10ns.	25ns.
t_{ASC}	Column address setup time	min. 0ns.	5ns.
t_{CAH}	Column address hold time	min. 15ns.	25ns.
t_{OES}	OEN lead time referenced to RASN	min. 0ns.	105ns.
t_{OED}	OEN to data delay time	min. 15ns.	80ns.

4. 3. Timing for read cycle

name	description	requirement	result
t_{RAC}	Access time from RASN	max. 60ns.	60ns.
t_{CAC}	Access time from CASN	max. 15ns.	15ns.
t_{AA}	Access time from column address	max. 30ns.	20ns.
t_{OEA}	Access time from OEN	max. 20ns.	100ns.
t_{RAL}	Column address lead time referenced to RASN	min. 30ns.	35ns.
t_{RCS}	Read command setup time	min. 0ns.	105ns.
t_{RRH}	Read command hold time referenced to RASN	min. 10ns.	65ns.
t_{RCH}	Read command hold time referenced to CASN	min. 0ns.	100ns.

4. 4. Timing for write cycles

name	description	requirement	result
t_{WCH}	WEN hold time referenced to CASN	min. 15ns.	20ns.
t_{WP}	WEN pulse width	min. 15ns.	60ns.
t_{RWL}	WEN lead time referenced to RASN	min. 20ns.	60ns.
t_{CWL}	WEN lead time referenced to CASN	min. 15ns.	60ns.
t_{WCS}	WEN setup time	min. 0ns.	40ns.
t_{DS}	Data-in setup time	min. 0ns.	15ns.
t_{DH}	Data-in hold time	min. 15ns.	175ns.

4. 5. Timing for fast page mode

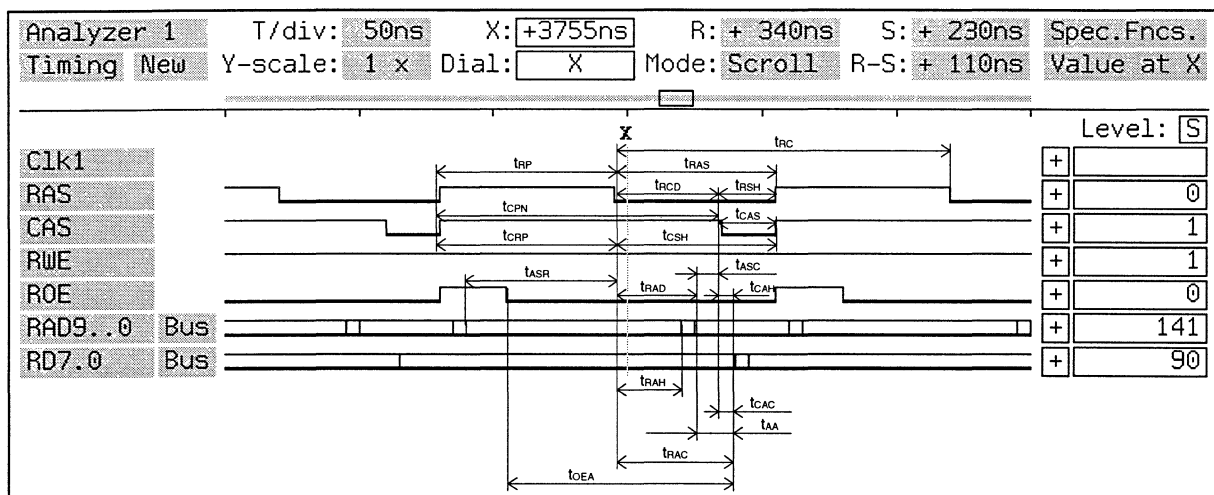
name	description	requirement	result
t_{PC}	Fast page mode cycle time	min. 40ns.	40ns.
t_{ACP}	Access time for CASN precharge	max. 35ns.	25ns.
t_{RASP}	RASN pulse width	min. 60ns. max. 125.000ns.	335ns.
t_{CP}	CASN precharge time	min. 10ns.	20ns.
t_{RHCP}	RASN hold time from CASN precharge	min. 35ns.	40ns.

Notes:

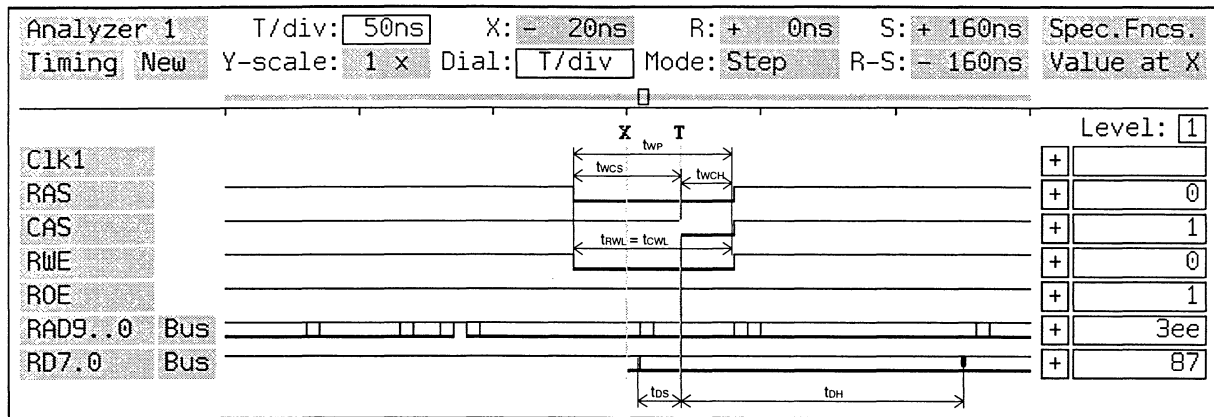
For the following figures:

Address = RAD9..0
 Data output = RD7..1
 Output enable or OEN = ROE
 Write enable or WEN = RWE
 Column address strobe or CASN = CAS
 Row address strobe or RASN = RAS

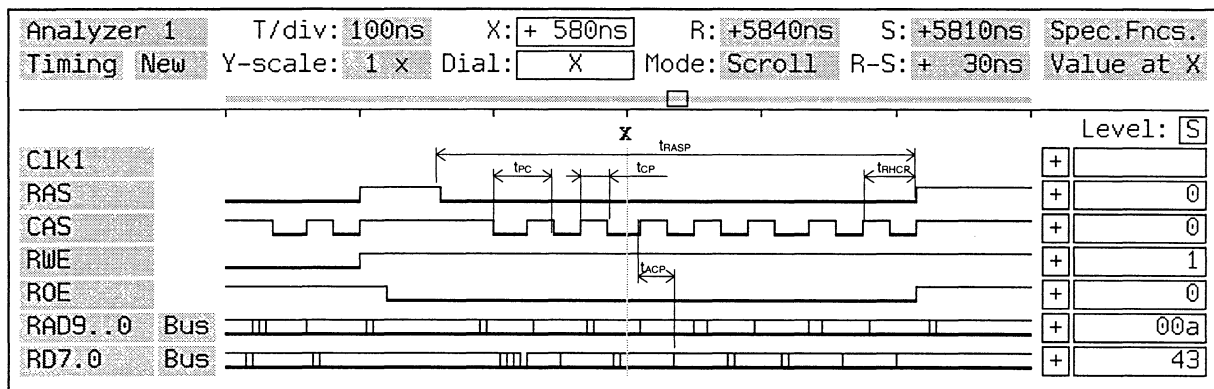
DRAM read cycle.



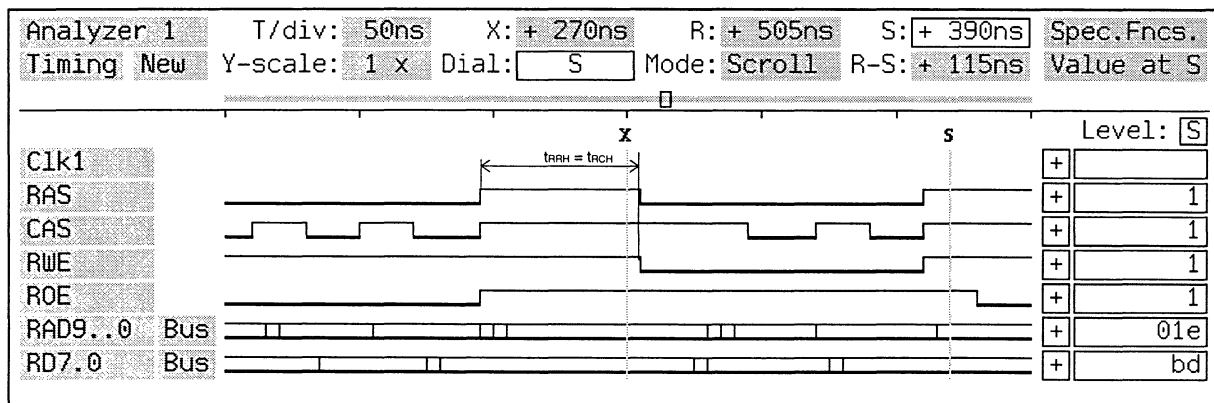
DRAM late write cycle.



DRAM fast page mode read cycle.



DRAM fast page late write cycle.



5. Communication between 80C32 microcontroller (7300) and SRAM (7304)

5. 1. General remarks

Low active signals are normally marked as: $\overline{RD}$

In most text editors this is not possible therefor these names are displayed as: RDN. N indicating low active.

5. 2. SRAM timing (UM6264DM-70LL)

5. 2. 1. SRAM read cycle timing *

name	description	requirement	result
t_{RC}	Read cycle time	min. 70ns.	415ns.
t_{AA}	Address access time	max. 70ns.	150ns.**
t_{ACE1}	Chip enable access time	max. 70ns.	185ns.**
t_{OE}	Output enable to output valid	max. 35ns.	15ns.
t_{CLZ1}	Chip enable to output in low Z	min. 10ns.	115ns.
t_{OLZ}	Output enable to output in low Z	min. 5ns.	-50ns.
t_{CHZ1}	Chip disable to output in high Z	max. 30ns.	-10ns.
t_{OHZ}	Output disable to output in high Z	max. 30ns.	75ns. **
t_{OH}	Output hold from address change	min. 10ns.	40ns.
t_{WHLH}	RDN or WRN high to ALEN high	min. 21ns.	35ns.
		max. 66ns.	
t_{LLDV}	Ale low to valid data	max. 183ns.	150ns.
t_{LLWL}	Ale low to RDN or low	min. 74ns.	135ns.
		max. 174ns.	
t_{RLRH}	RDN pulse width	min. 149ns.	245ns.
t_{AVLL}	Address valid to ALEN low	min. 28ns.	40ns.
t_{LLAX}	Address hold after ALEN low	min. 21ns.	85ns.
t_{RLAZ}	RDN low to address float	max. 0ns.	-50ns.
t_{RLDV}	RDN low to valid data in	max. 118ns.	15ns.
t_{RHDX}	Data hold after RDN	min. 0ns.	75ns.
t_{AVWL}	Address valid to RDN low	min. 91ns.	175ns.
t_{AVDV}	Address valid to data in	max. 209ns.	190ns.

Notes:

* = Read cycle done with CE2 (chip enable) high = active.

** = Only in case that a cycle time of 100ns is required these values must meet also the maximum requirements.

For the following figures:

Address =	UA17..01
Data output =	AD7..1
Output enable or RDN =	URDNX
Chip enable =	SRAMCSN
Write enable or WRN =	UWRN
Address latch =	ALEN

AU01 to UA07 are latched from the data-bus with ALEN. Address validity appears with falling edge of the ALEN signal.

5. 2. 2. SRAM write cycle timing *

name	description	requirement	result
t _{WC}	Write cycle time	min. 70ns.	415ns.
t _{CW}	Chip enable to end of write	min. 70ns.	500ns.
t _{AS}	Address Set-up time	min. 0ns.	130ns.
t _{AW}	Address valid to end of write	min. 60ns.	375ns.
t _{WP}	Write pulse width	min. 40ns.	245ns.
t _{WR}	Write recovery time	min. 0ns.	40ns.
t _{WHZ}	Write to output in high Z	max 30ns.	-45ns.
t _{DW}	Data to write time overlap	min. 30ns.	220ns.
t _{DH}	Data Hold from write time0	min. 0ns.	40ns.
t _{OW}	Output active from end of write	min. 5ns.	60ns.
t _{WHLH}	WRN high to ALEN high	min. 21ns. max. 66ns.	40ns.
t _{LLWL}	ALEN low to WRN low	min. 74ns. max. 174ns.	130ns.
t _{WLWH}	WRN pulse width	min. 149ns.	245ns.
t _{AVLL}	Address valid to ALEN low	min. 28ns.	40ns.
t _{LLAX}	Address hold after ALEN low	min. 21ns.	85ns.
t _{QVWX}	Data valid to WRN transition	min. 21ns.	45ns.
t _{AVWL}	Address valid to WRN low	min. 91ns.	170ns.
t _{WHQX}	Data hold after WRN	min. 21ns.	40ns.

Notes:

* = Write cycle done with CE2 (chip enable) high = active.

For the following figures:

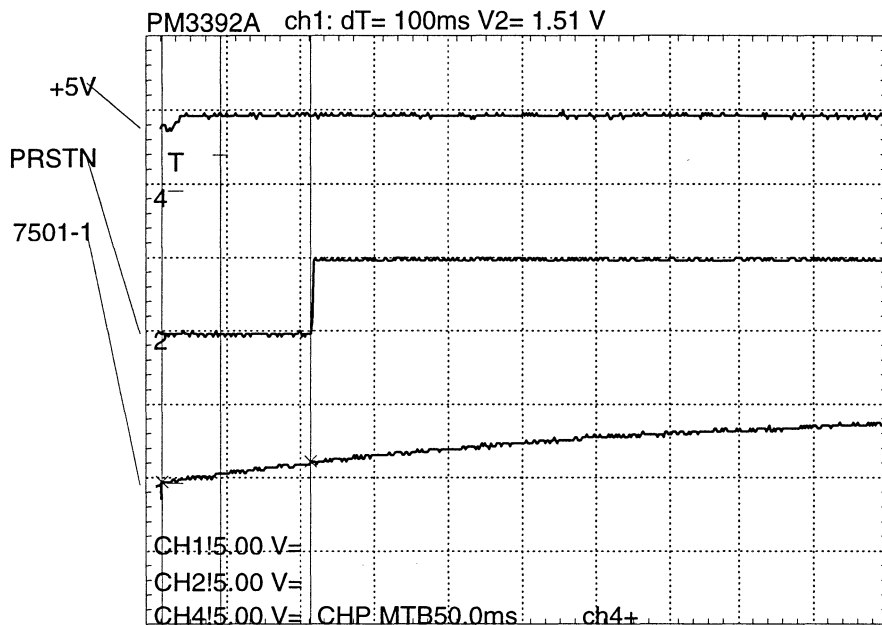
Address =	UA17..01
Data output =	AD7..1
Output enable or RDN=	URDNX
Chip enable =	SRAMCSN
Write enable or WRN =	UWRN
Address latch =	ALEN

AU01 to UA07 are latched from the data-bus with ALEN. Address validity appears with falling edge of the ALEN signal.

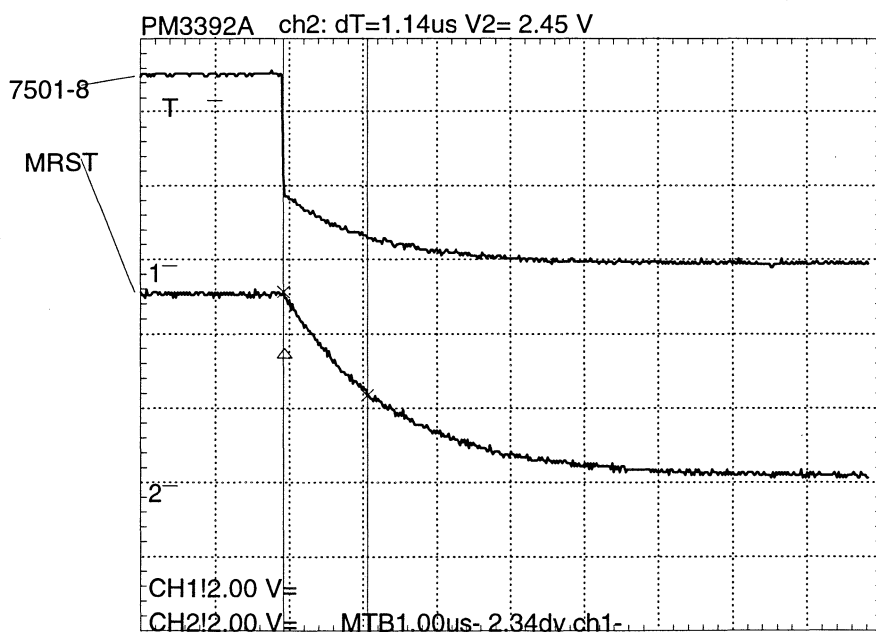
6. Timing of reset circuit

Reset of the drive can be generated by power on or by the host (IDE connector 1581 pin 1, active low). The reset of the 80C32 microcontroller (7300) is delayed with respect to the OTI-975 reset (RCdelay 3524/2520). This is because the OTI-975 needs some time after reset to generate the 80C32 system clock of 24MHz (7400 pin 15).

Power on Reset

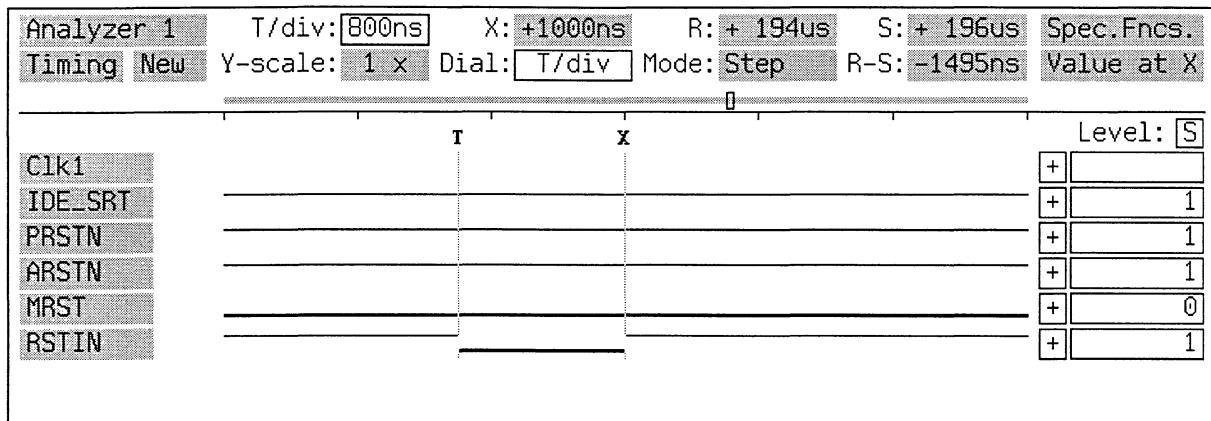


Reset delay 80C31

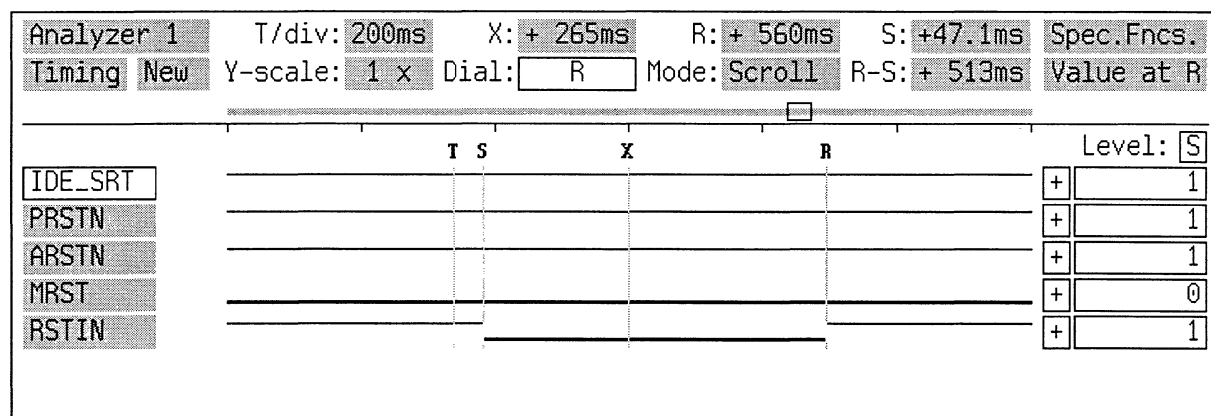


Measured on 3524 (100Ω) and on 2520 (10nF).

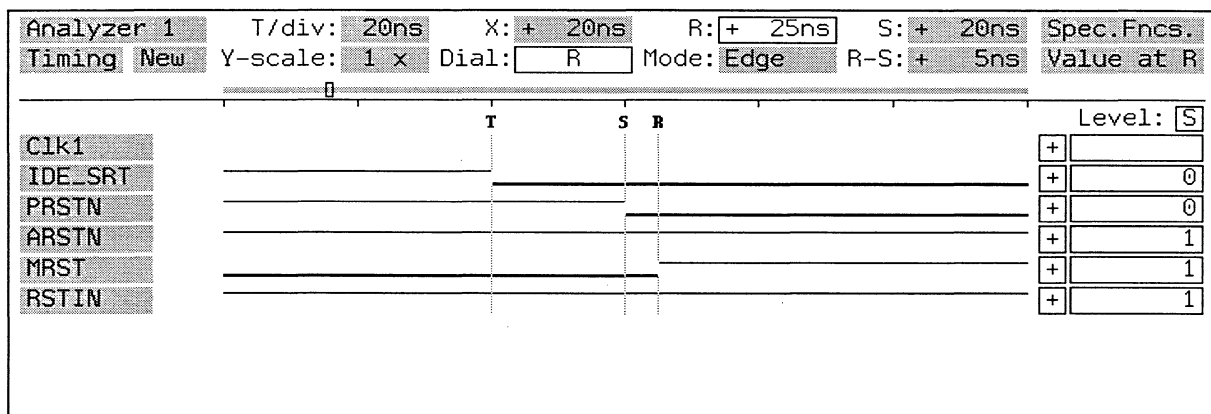
ATAPI soft reset.



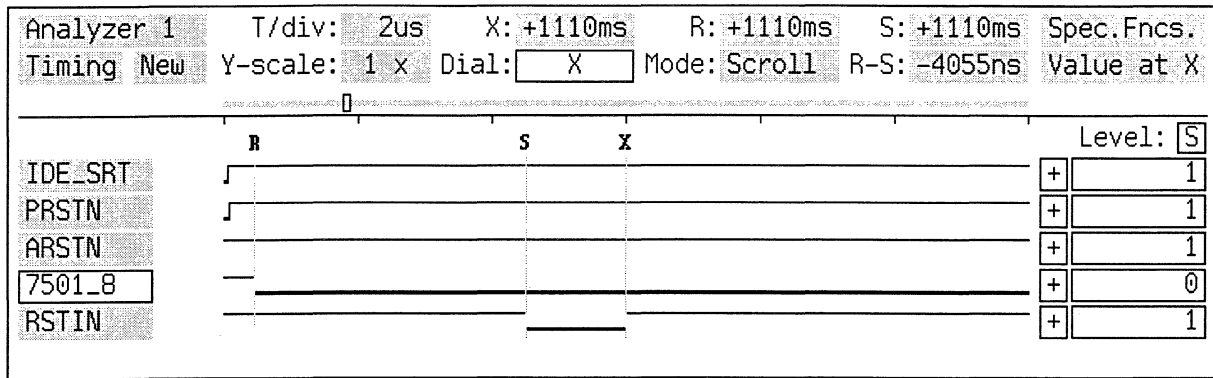
ALT-CTRL-DELETE reset.



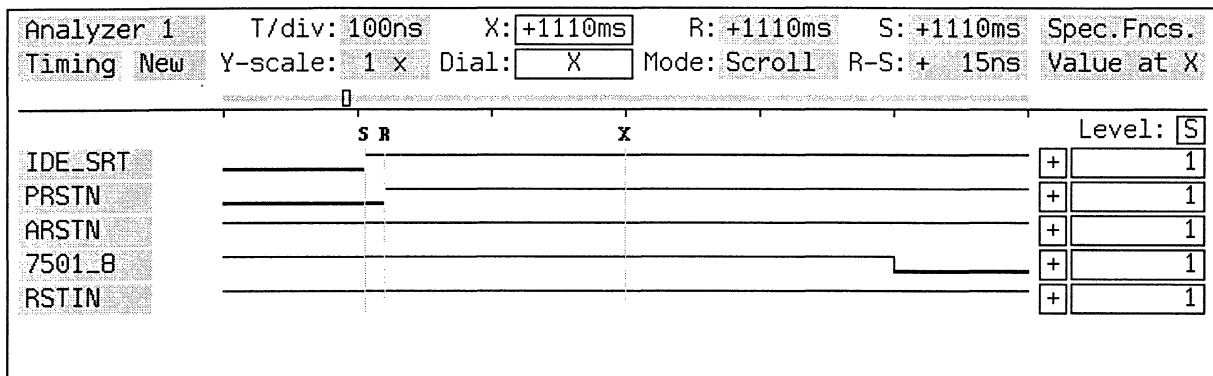
Push Reset button.



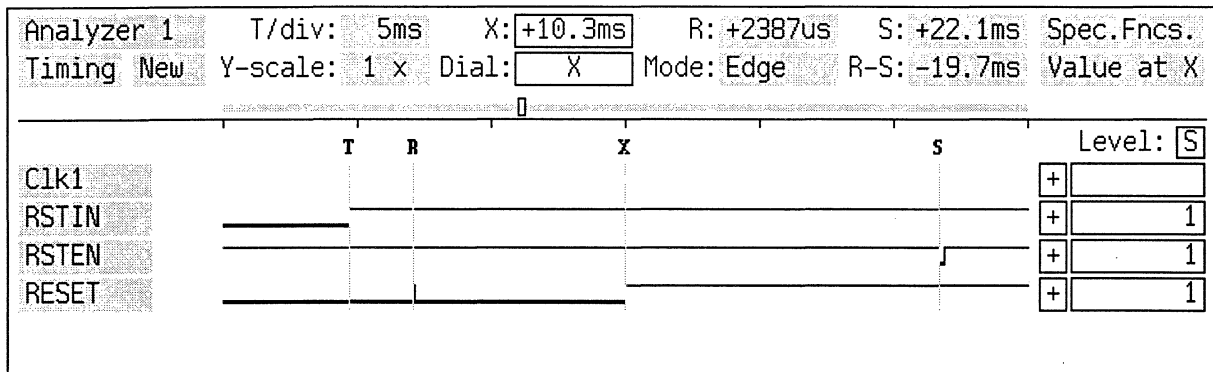
Release reset button.



Detail Release reset button.



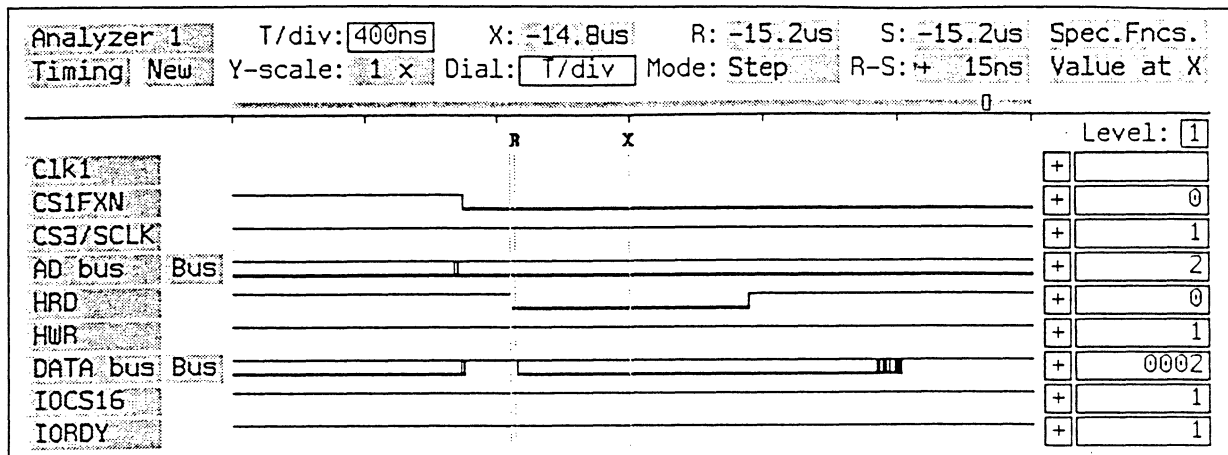
Servo reset.



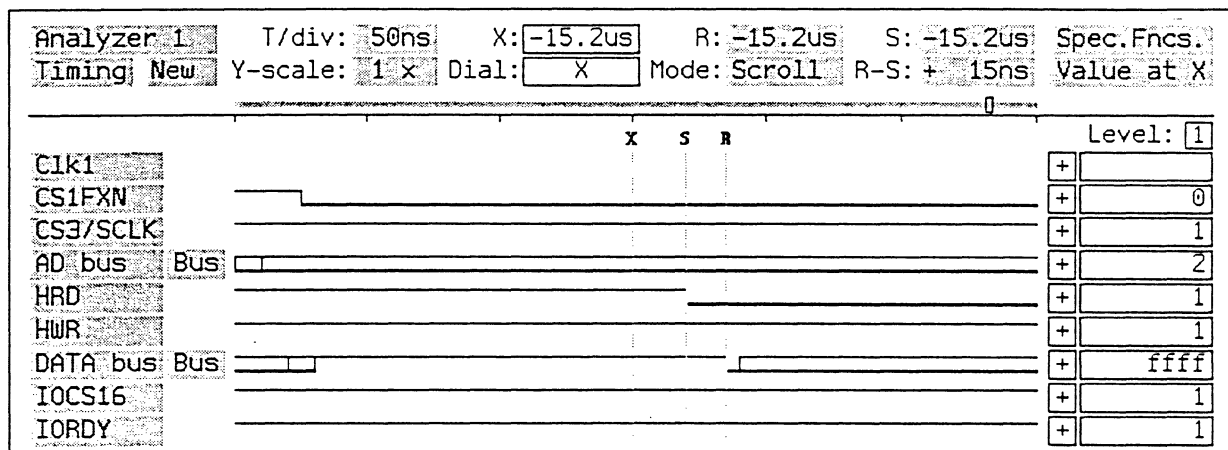
7. Communication between OTI-975 (7400) and Host via IDE

Signals are measured on IDE connector 1581.

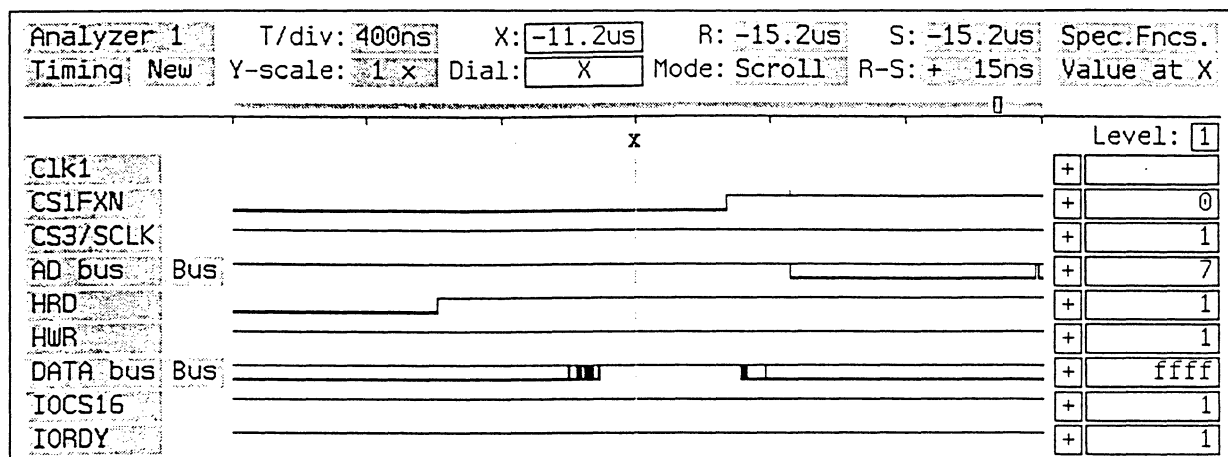
8 bit wide read.



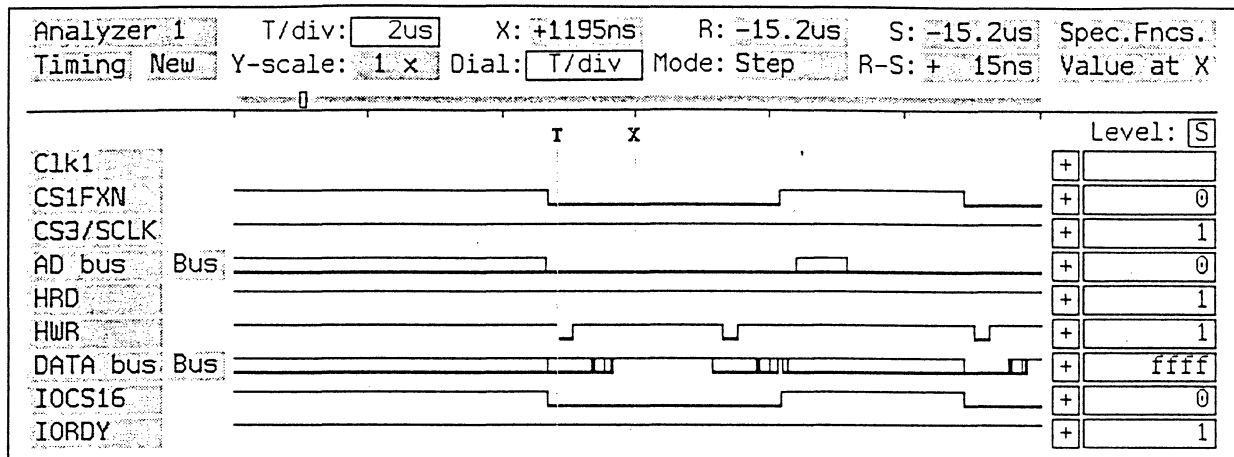
8 bit wide read beginning detailed.



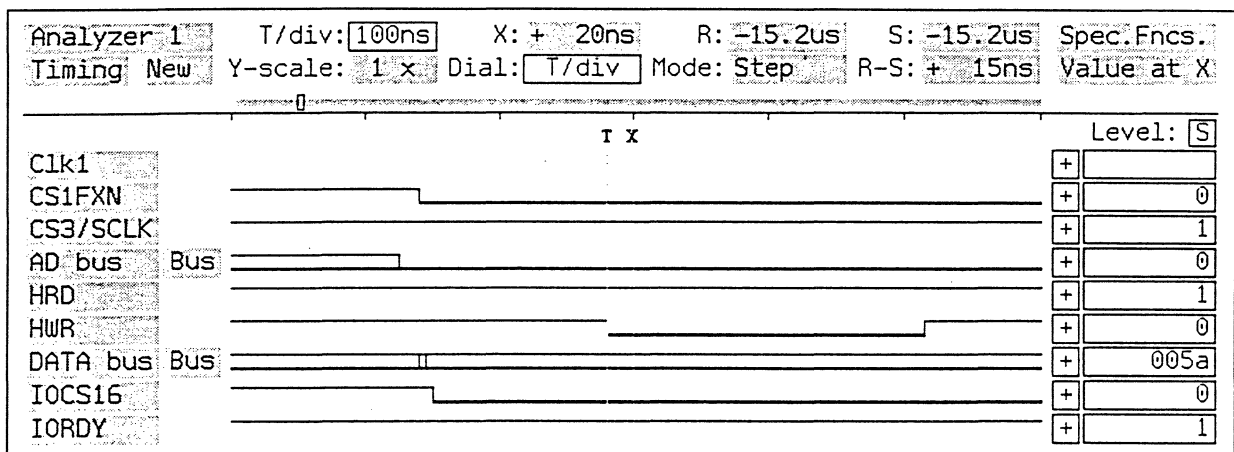
8 bit wide read end detailed.



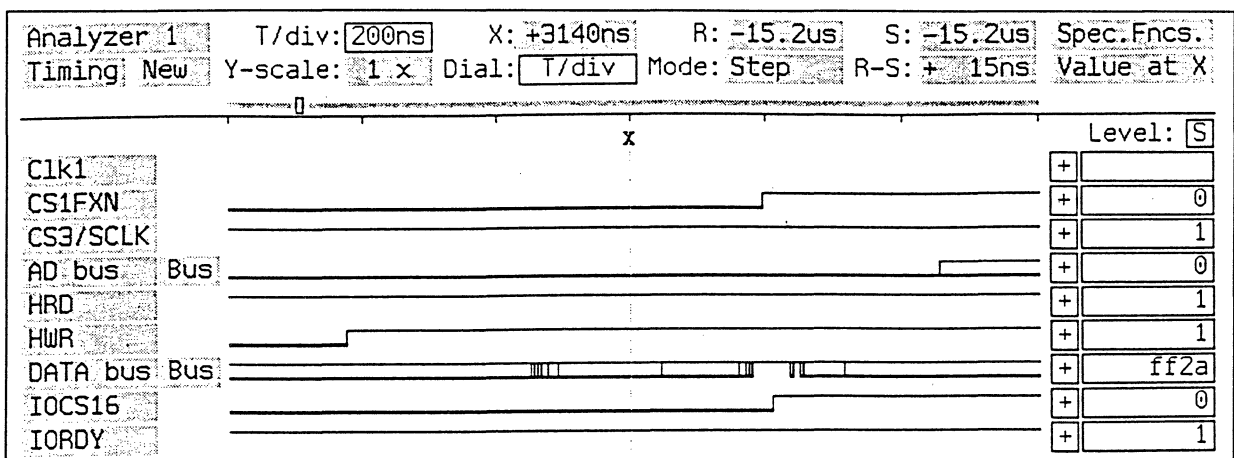
16 bit wide write, overall.



16 bit wide read, beginning detailed.



16 bit wide write, end detailed.



8. Communication between OTI-975 (7400) and Servo Microcontroller NEC (7170)

Exchange of information between 80C32 (User μ P) and NEC (Servo μ P) via OTI-975 with respect to:

- subcode data
- commando's
- parameters
- status information

The communication is based on transmitting and receiving of datablocks from User μ P to Servo μ P (basic) and from Servo μ P back to the User μ P in the same cycle.

This protocol supports all reading ($N = 1, 2, 4, 6$) and writing ($N = 1, 2$) speeds. This exchange of data is only allowed during the first half of the command sync signal (COMSYNC). The Servo μ P writes the first byte of a data block in its serial shiftregister following asserting the acknowledge line with a Low. The User μ P will react after reception of the acknowledge (ACK) from the Servo μ P by preparing the data block in its serial shiftregister. Now a communication clocksignal (COMCLK) will be generated by the User μ P, which allows exchange of both bytes between the microcontrollers. The data bytes are latched at the leading edge communication clocksignal (COMCLK).

The Servo μ P releases the acknowledge line every shift of 8 bits. At $N = 1$ en $N = 2$ speed the frequency of COMSYNC and SYSSYNC are equal however with a certain delay, at $N = 6$ speed the frequency of the SYSSYNC is $3 \times$ COMSYNC.

The interface is as follows:

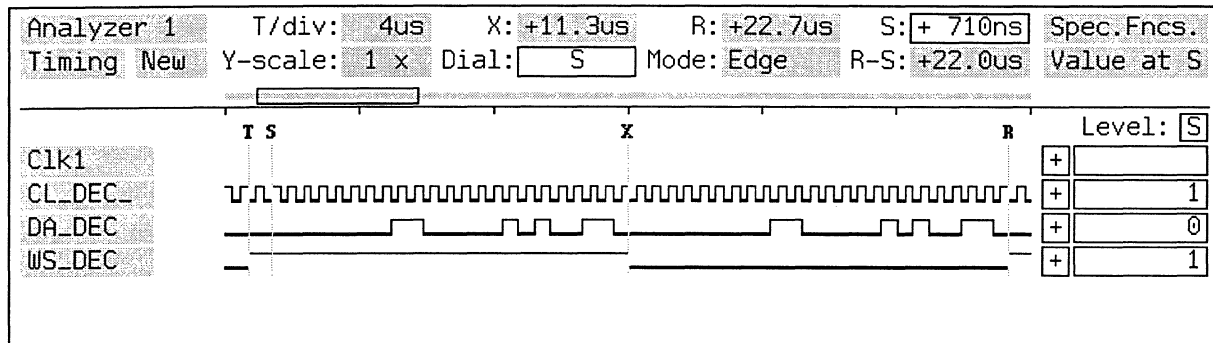
SYSSYNC:	SYStem SYNC from Servo μ P
COMSYNC:	COMmunication SYNC from Servo μ P
ACK:	ACKnowledge from Servo μ P
COMCLK:	COMmunication CLock from User μ P
SI:	Serial data from Servo μ P to User μ P
SO:	Serial data from User μ P to service μ P

9. Communication I²S

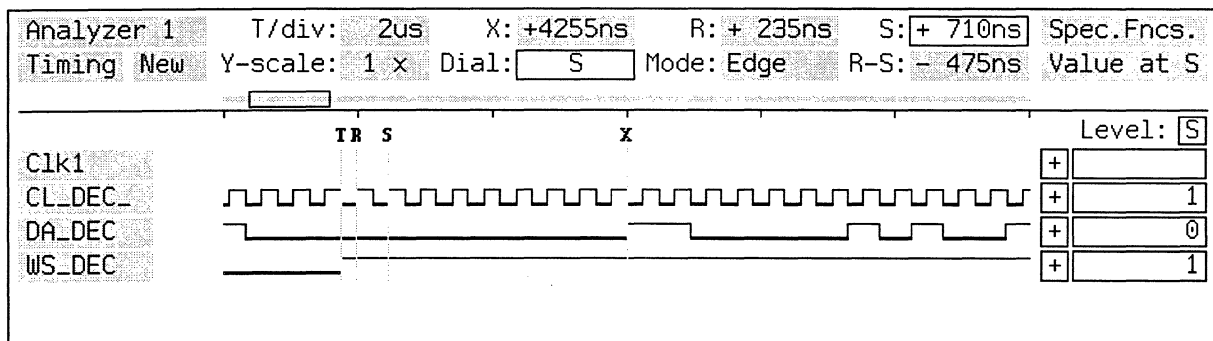
Timing diagram: CL_DEC: 7400 pin 54
DA_DEC: 7400 pin 55
WS_DEC: 7400 pin 51
CL_ENC: 7400 pin 12
DA_ENC: 7400 pin 11
WS_ENC: 7400 pin 10

9. a. Audio play

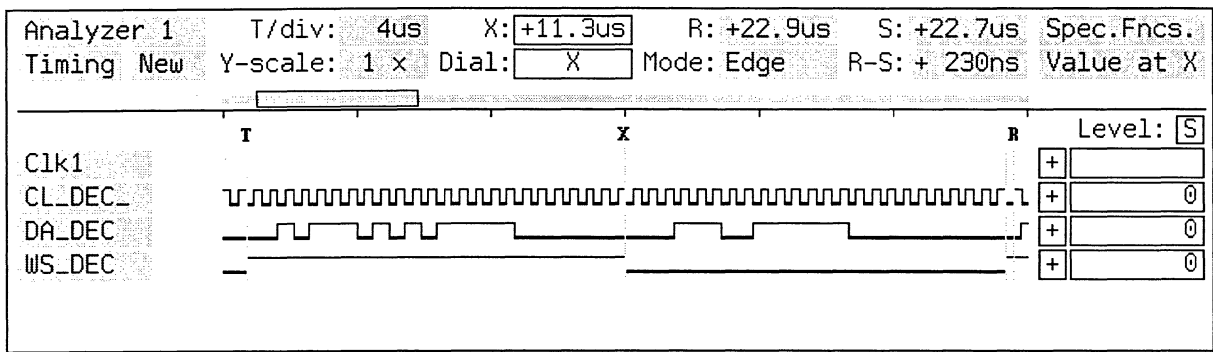
I²S Audio on N = 1



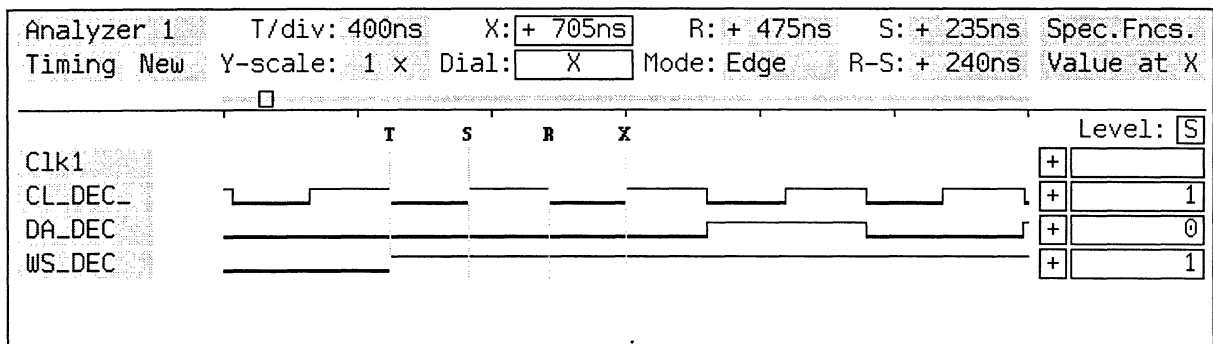
Detail:



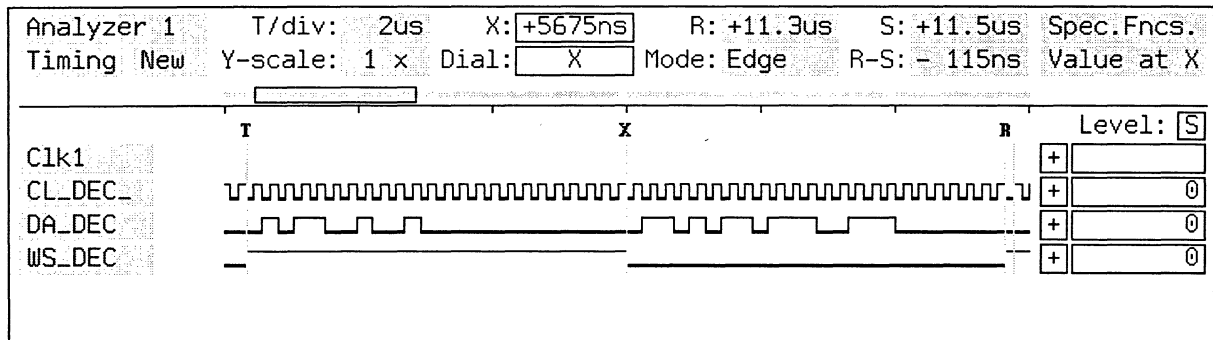
9. b. Read N = 1



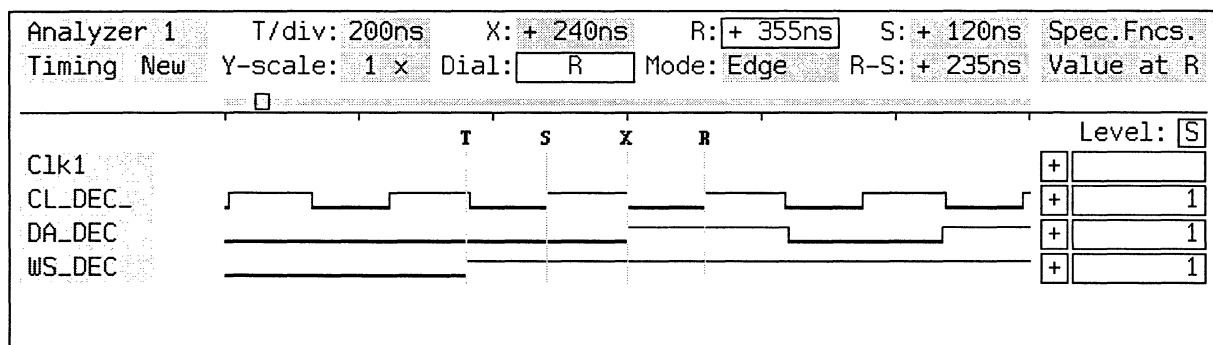
Detail:



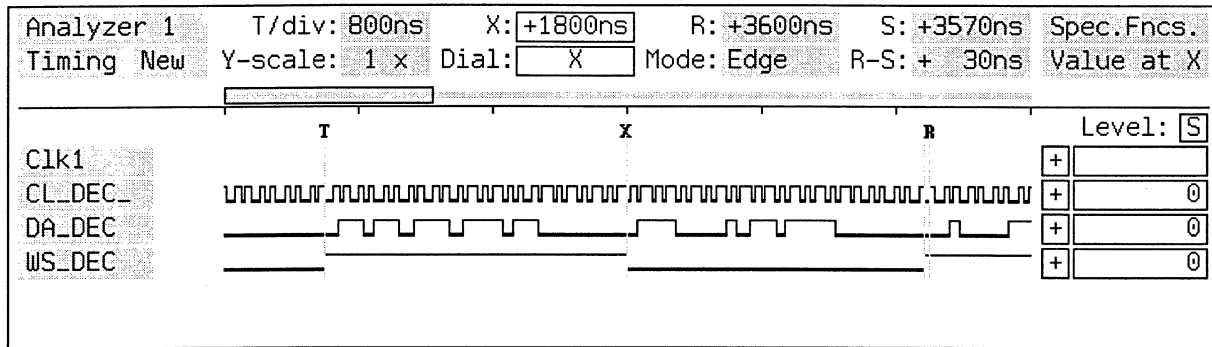
9. c. Read N = 2



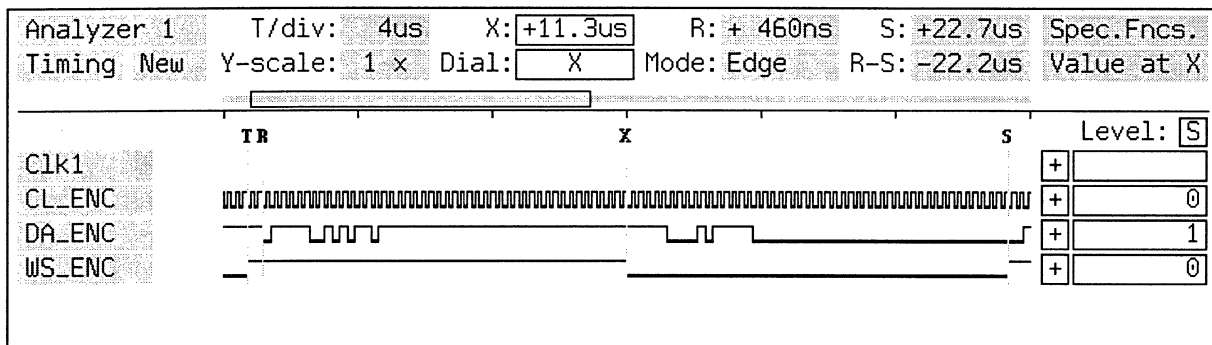
Detail:



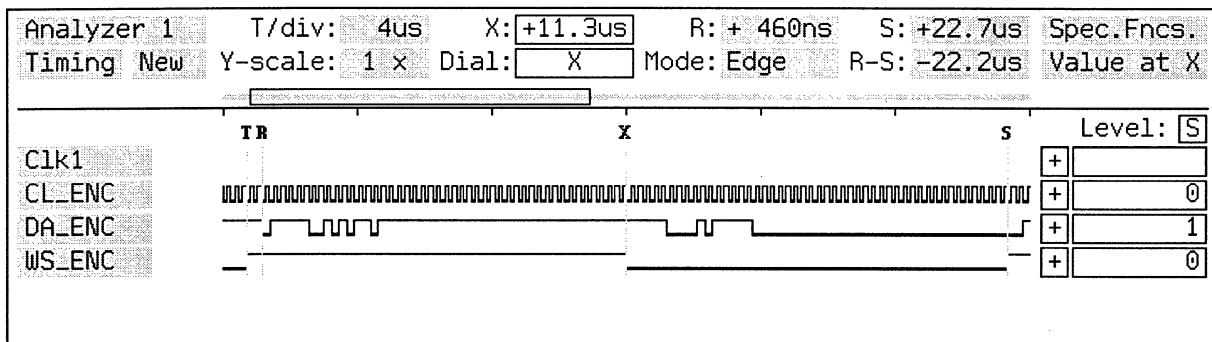
9. d. Read N = 6



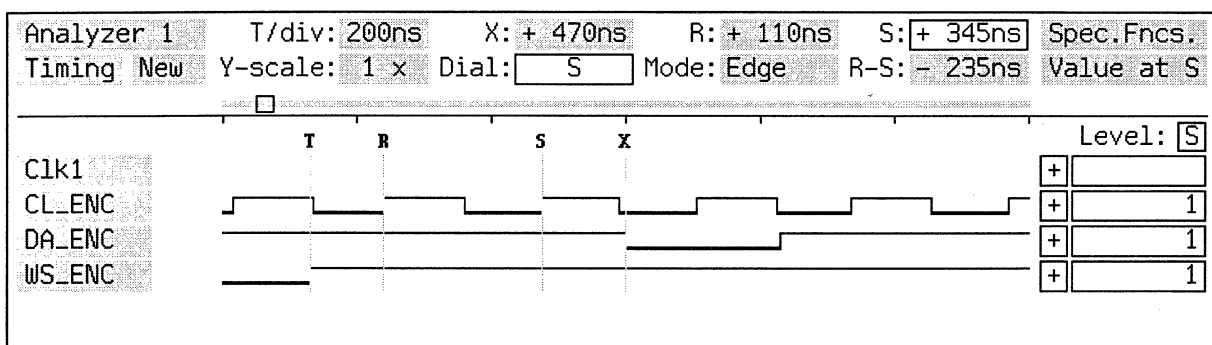
Detail:



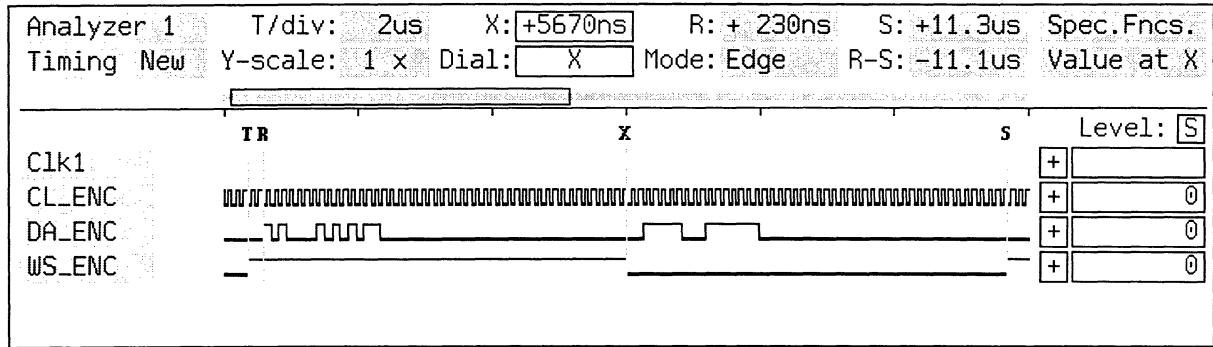
9. e. Write N = 1



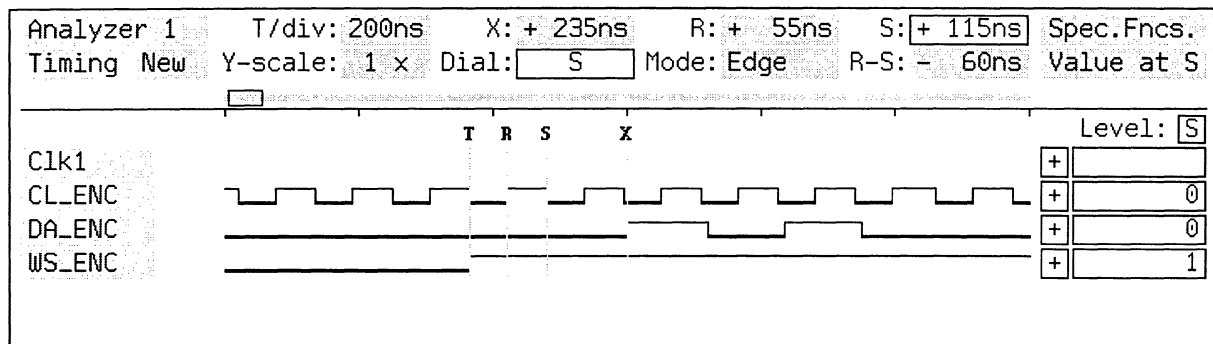
Detail:



9. f. Write N = 2



Detail:



10. Selftest

80C32 (7300)

The 80C32 microcontroller has an onboard selftest which can be activated by holding the trayswitch pressed during Power up.

During a test, the LED lights yellow. After a test, the LED blinks GREEN or RED depending on the result of the test.

The number of times the LED blinks, indicates which test has been performed.

Tests:

1. Internal RAM 80C32 256bytes
2. SRAM 8k W/R
5. DRAM/OTI write
6. DRAM/OTI read

After the selftest has been performed, the 80C32 controller automatically resumes normal activity.

NEC controller (7170)

After the 80C32 microcontroller (7300) initiates the NEC by pulling 7170 pin 7 low, the NEC controller starts a selftest sequence.

The results of this tests can be monitored by a serial terminal connected to solderjumper 1599.
(1599.1 = Tx, 1599.2 = GND)

Drive Demounting Instructions
Mechanical and Electrical Adjustments
CDM3600 Demounting Instructions
Service Tools

Chapter 5

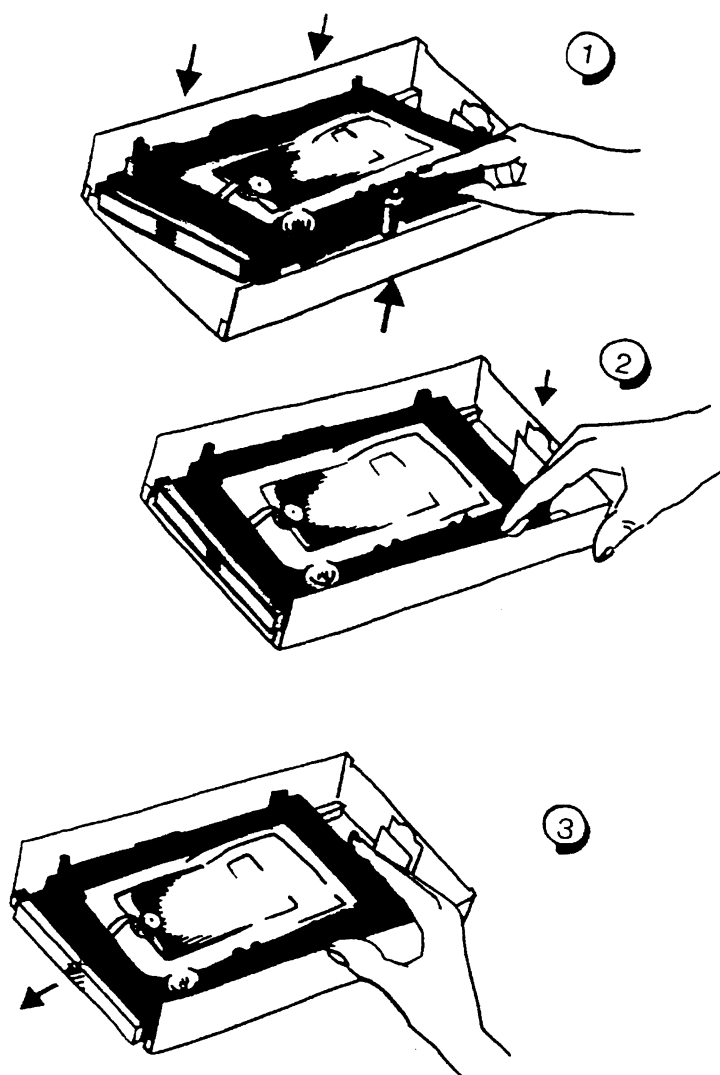
DEMOUNTING THE DRIVE

- Remove the 4 (Torx 8) + 2 (Torx 10) screws on the bottom side of the drive.
- Remove the bottom cover.
- Remove the front panel.
- Remove the shielding.
- Before the main PCB can be placed in its service position the tray has to be drawn open (see figure) and the wiring of the tray motor and switch has to be removed (on both sides of the PCB) left and right.
- Now the loader can be removed by retaining the 4 (Torx 10) screws on both sides of the loader.
- Restore the position of the main PCB.
- Remove the loader (+ main PCB) by lifting the left side, seen from behind with the drive turned upside down.

MOUNTING THE DRIVE

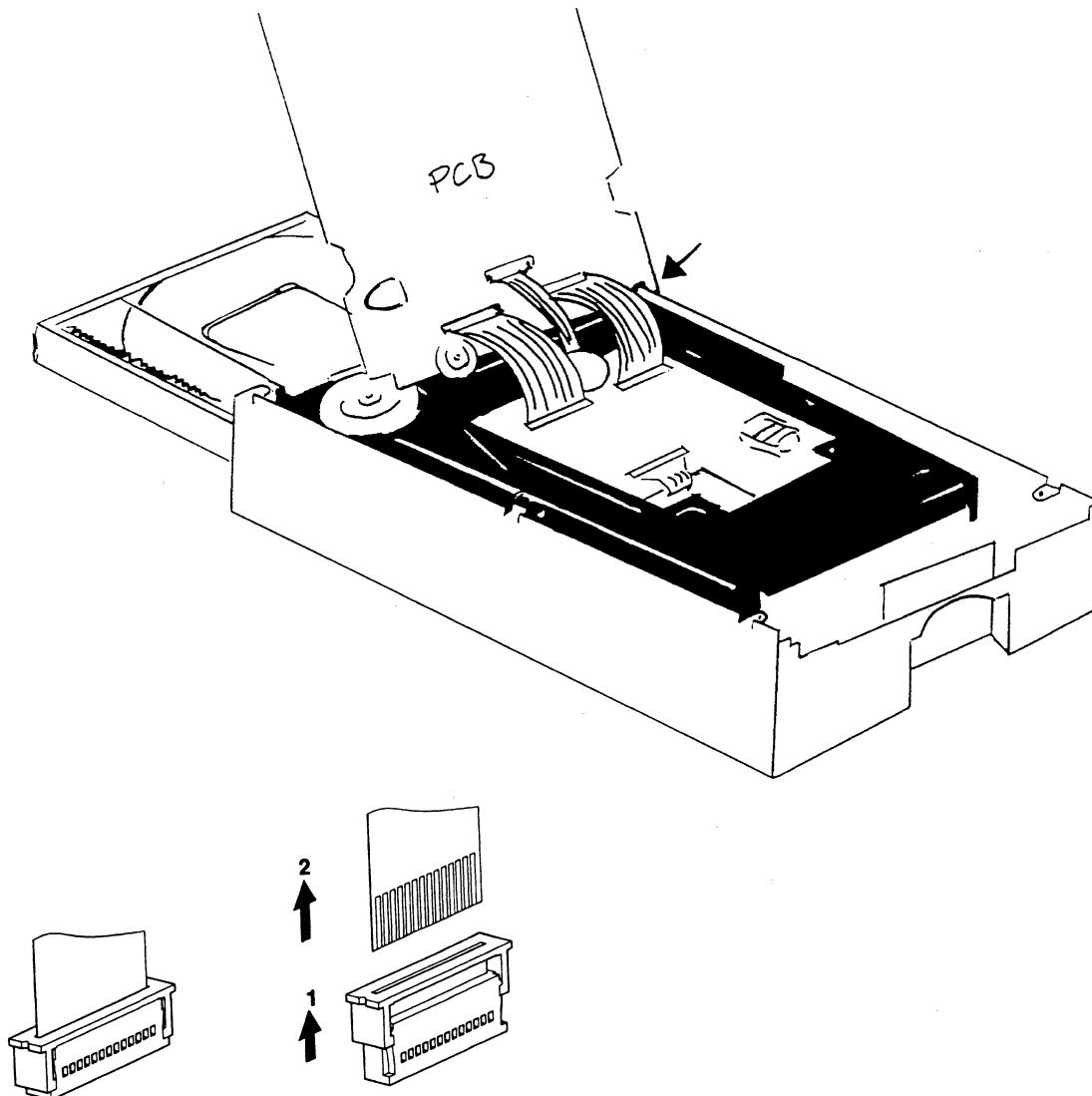
Use the demounting instruction in opposite following order.
See also the drawings step 1, 2 and 3.

Mounting instruction loader assy



SERVICE POSITION MAIN PCB

- Note:
- ➔ The service position is only meant for connecting and disconnecting the flex foil (no other measurements).
 - ➔ This position can only be created by opening the tray.
 - ➔ Mind the motor flex for damaging because length is rather short.



- Warnings:
- ➔ Flex foils can be removed from the connectors on the main PCB or laser PCB by lifting the upper part of the connector and taking the flex foil (see figure).
 - ➔ After disconnecting of the flex foil the CDM should be protected against ESD by short circuiting the flex by means of a paperclip or conductive clip.
 - ➔ Since laser, monitor diode and photodiodes are very sensitive to electrostatic discharges, careless handling during servicing may reduce life expectancy drastically. For this reason care should be taken that during servicing the potentials of the aids and yourself are equal to that screening of the set.



MECHANICAL ADJUSTMENTS

Clamper spring alignment procedure.

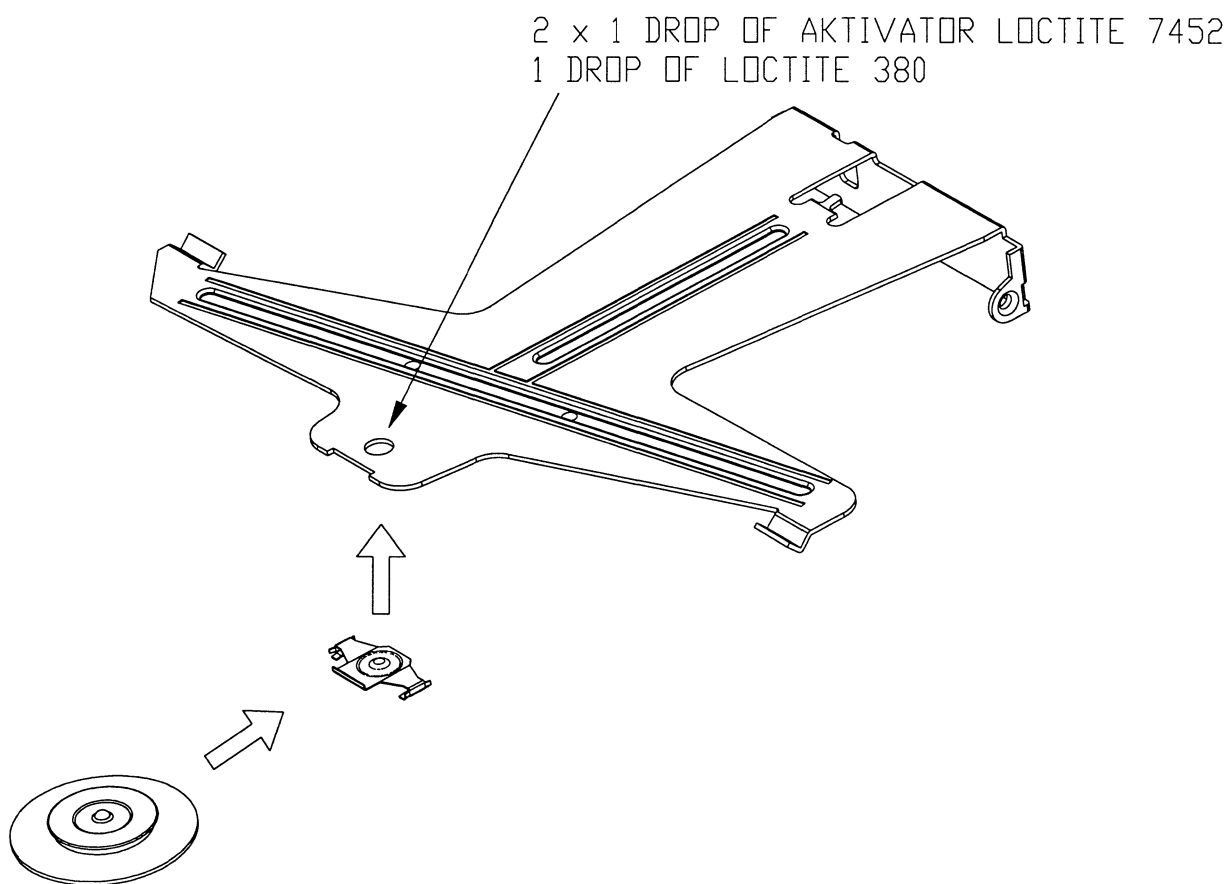
Always when the motor (including the CDM mounting plate), CDM or the clamper spring itself has to be exchanged, then the clamper spring where to the clamper is attached has to be re-aligned. This is necessary because of the high risk for unbalance of the disc at high rotation speed ($n = 4$).

Procedure:

The clamper is attached to a spring. This spring is glued with a special sealing paste (called: Black Max) to the clamper hold-down assy. The clamper assy and the spring has to be placed always by a new set (including assy and spring).

Attaching the spring to the assy:

- ◆ Replace the new assy without spring.
- ◆ Place the special tool with the spring on the turntable and glue this together.
- ◆ After hardening of the glue the tool can be removed and the clamper can be placed onto its place in the clamper spring.



DEMOUNTING LOADER CDL3600

Remove the following items starting with:

➤ Clamper assy spring

Pos. 58 with a pair of tweezers, keep the clamper (48, 54, 55) in the downward position on the turntable.

➤ Clamper assy

By lifting the clamper from the turntable motor and shifting the assy to the left out of the guides on the CDM24 sub chassis assy.

➤ Tray

Pull out the tray (70) until it sticks. Press the two locks on both sides of the chassis assy outwards. Pull out the tray.

➤ Subchassis

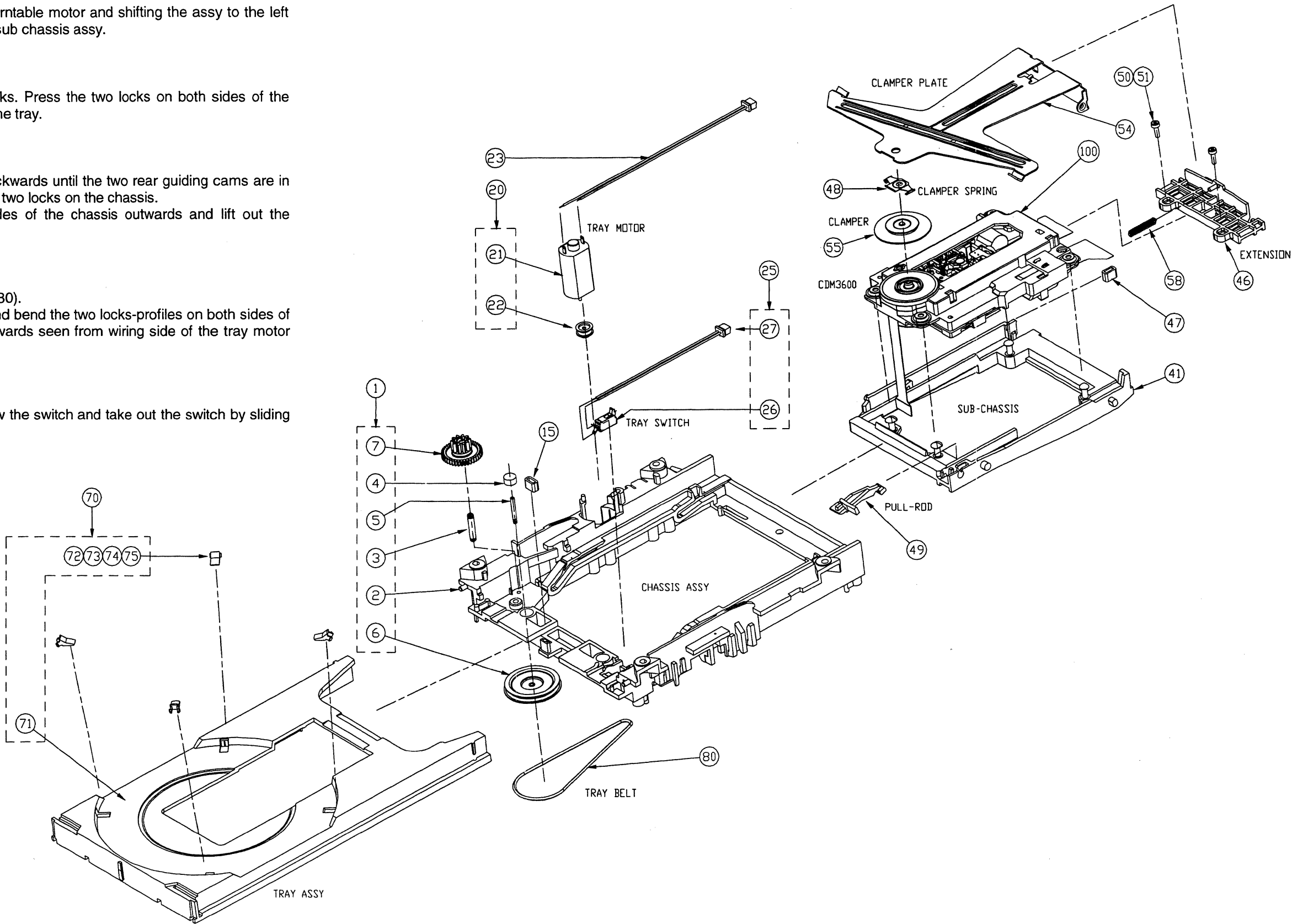
Shift the sub chassis pos. 41 backwards until the two rear guiding cams are in a position corresponding with the two locks on the chassis. Bend the two locks on both sides of the chassis outwards and lift out the chassis.

➤ Tray motor assy

First remove the tray motor belt (80). Place the chassis on the table and bend the two locks-profiles on both sides of the tray motor compartment outwards seen from wiring side of the tray motor (20). Remove the tray motor.

➤ Switch assy

Hold down the locking cam below the switch and take out the switch by sliding it inwards.



MOUNTING LOADER CDL3600

Rebuilding the loader starting from a new (empty) chassis.

- Replace the switch-assy (25) and the tray motor (20) assy.
- Replace the CDM (100) into the 4 shafts on the sub-chassis (14) of the loader.
- Push on the grommets otherwise they will come out.
- Apply a little grease on the 4 cams on both sides of the subchassis and the corresponding slides in the chassis.
- Replace the subchassis starting with the 2 cams in front of the subchassis into the two long holes on both sides of the chassis.
- Then shift the subchassis to the front side of the chassis until the two rear cams can fall into the holes on the chassis; then push the subchassis downwards.
- Replace the pull rod, item 49.

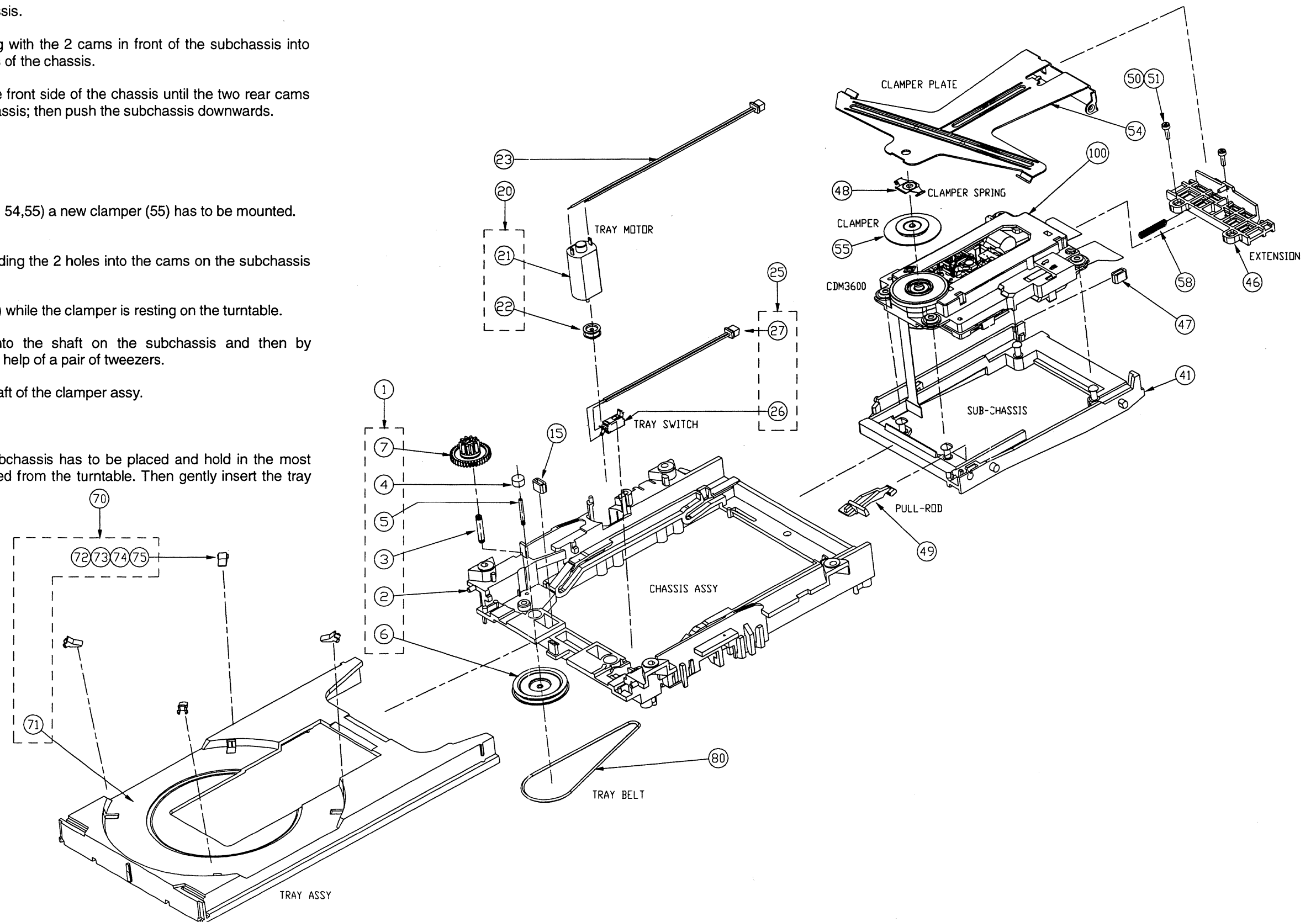
Clamper assy

Before replacing the clamper assy (48, 54,55) a new clamper (55) has to be mounted. See also clamper adjustment.

- Replace the clamper (55) by sliding the 2 holes into the cams on the subchassis of the CDM.
- Replace the clamper spring (48) while the clamper is resting on the turntable.
- First insert the spring (58) into the shaft on the subchassis and then by compressing the spring with the help of a pair of tweezers.
- Place the other end onto the shaft of the clamper assy.

Tray assy

Before replacing the tray (70), the subchassis has to be placed and hold in the most forward position so the clamper is lifted from the turntable. Then gently insert the tray into its slides.



CDM3600

The CDM can be removed easily by lifting of the CDM from the 4 cams on the subchassis.

Demounting CDM3600

Remove the following items starting with:

CDM3600 Panel (PCB)

- ➡ Desolder the sledge motor wiring.
- ➡ Remove the 4 screws on the corners of the PCB.
- ➡ Open the flex connector and remove the flex wire coming from the OPU.

Take ESD precautions by placing a clip or paperclip over the leads of the flex wire!

Sledge gear

- ➡ Turn the CDM on its back carefully. It is preferable to place the chassis on a raised area so that the turntable is free.
- ➡ Lift the gear with a pin or tweezers carefully from its shaft (replace always the old gear by a new one).
- ➡ Check that no plastic residu remains in the notch.
- ➡ Un-hook the spring clips from the OPU spindle from the top side (replace always the old spring clips).
- ➡ Turn over the CDM and remove the spring clips.
- ➡ Now the spindle with the OPU can be taken out.
- ➡ Take out the OPU spindle from the mounting plate.
- ➡ Remove the gear-rack and the spring.

Sledge motor

- ➡ Un-hook the motor spring clip, this can be reached from the top-side of the mounting plate.
- ➡ Remove the clip spring which is covering the motor.
- ➡ Now the motor with the spring blade below the motor can be removed.

Mounting CDM3600

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.

CDM3600 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 TOOLS

3104 129 52080* SERVICE TEST TOOL CDD3610

3104 149 00410* CDR 63QE SELECTED ATER

4822 397 30245 SBC 444 TEST DISC

4822 395 50145 SET TORX SCREWDRIVERS

4822 395 50445 T-3 TORX SCREW DRIVER

REMARK: ITEMS MARKED BY AN ASTERIX (*) (3104 NBR) CAN NOT BE OBTAINED VIA
REGULAR LOGISTICS SERVICE CHANNELS.
ONLY AVAILABLE ON REQUEST.

Soldering Instructions

Chapter 6

ADVISES ON REPLACEMENT OF LARGE SURFACE MOUNTED COMPONENTS (SMC's)

The usual trend development in complexity on ICs and μ Ps has to make the handling for service workshops as normal practice.

Parts like the DSP and μ P are 80 pins plastic Quad Flat Packages (QFP) with:

Lead width = 0,3 mm
Pitch = 0,65 mm

Replacing the QFPs with fine pitch requires careful handling and good workmanship preventing a damage of the QFP leads, leadpads on the PCB-substrate and the adjacent parts with their solder connections.

A. General advises

- Work carefully
- Apply appropriate equipment
- Use proper lighting
- Apply a magnifying-glass for visual inspections
- Do not cut with a knife
- Leads are sensitive for bending or damage during handling
- Take care for ESD

B. Workmanship

- Keep temperature as low as possible
- Keep time of desoldering restricted
- Pay attention to the differences in desoldering and resoldereing
- Do not apply mechanical forces to lift the QFP from the PCB
- Select good flux and solder
- Look with attention and monitor your process
- Clean after desoldering

C. Methods for removal by desoldering

C.1. Desoldering by contact heating

Advantages:

- Heat is directly introduced in the leads
- Adjacent components will not be heated

Disadvantages:

- Proper contact on all leads simultaneously sometimes problematic
- Risk of damage of leads

Method:

- Select proper desolder tip according to the instruction for use
- Use solder for improving thermal contact
- Temperature: from 250 °C for 6 sec. to 300 °C for 3sec.
Max. temp.: 320°C for 3 sec. max.
- Remove excessive solder with solderwick or litze
- Clean after desoldering
- Inspect lead pads on PCB

C.2. Desoldering by heated air

Remark:

The hot air for these methods has a temperature far over 400°C. Keep in mind the proper distance to prevent burning of material and keep the time as short as possible.

Advise: With lower air temperature the risk on burned material is less!

Advantages:

- No contact necessary
- No damage of leads

Disadvantage:

- Adjacent components to be protected from hot air flow
- Overheating, risk of burning and fatal damage

Method:

- Read and follow precisely the instructions from the equipment
- Select nozzle with related temperature and air flow setting
- Shield adjacent parts from heat, also do not touch adjacent parts during heating
- Use NO-CLEAN flux for good thermal contact
- Keep nozzle e.g. 5 mm above QFP leads according to instructions
- Desoldering time in between 3-5 sec.
- Lift QFP
- Remove excessive solder instructions with solderwick or litze
- Clean after desoldering

Methods for soldering QFPs

- By hot air
- By conventional soldering iron

A. Soldering QFP's by hot air

This method requires a high degree of experience and process control. For soldering a paste is used containing solder particles. The handling of paste is critical as the final control of the total of soldering quality is difficult to be carried out.

Unless with proven available experience this method is advised to be avoided.

B. Soldering QFP's with a soldering iron

Method:

- Select and use appropriate soldering tip
- Do not touch leads by fingers
- Check the proper positioning of all leads
- Position QFP on cleaned location
- Check references of the position
- Apply NO-CLEAN flux
- use the appropriate thickness of soldering wire 0,3 - 0,5 mm
- Solder lead by lead
- Monitor by magnifying glass or microscope

Equipment:

Within PHILIPS the preferred supplier is PACE Inc. for various types of surface mount soldering equipment. This equipment can be applied also for all types of components.

Contact the PACE Inc. distributor in your country or else.

Soldering material:

The thickness of the wire is important for the solder/flux core relation for fine pitch QFP's. The line techniques require wire thickness of max. 0,5 mm.

Do not use usual types with diameter 0,8 or 1 mm.

Flux material:

The usual flux (like 4822 390 50025) leaves residues after desoldering and soldering. The residues usually can be aggressive and have negative influence on the soldering quality.

The NO-CLEAN flux types are less aggressive and do not require cleaning afterwards.

Contact the PACE Inc. distributor in your country or else.

Cleaning material:

Use clean alcohol (or ethanol) with a little brush.

CODE NUMBERS / SURVEY SOLDERING TOOLS

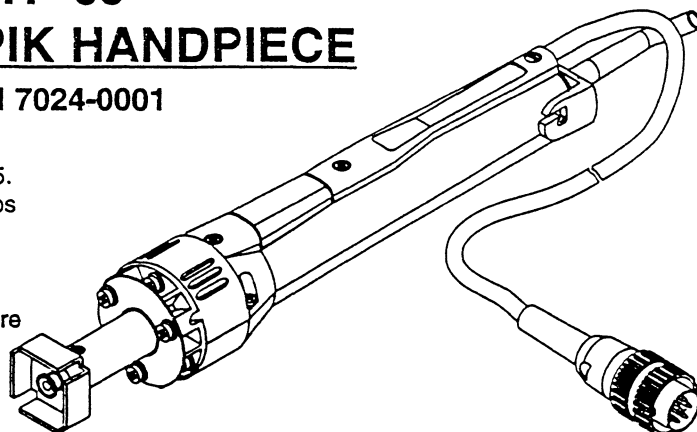
ITEM	CODENR.	DESCRIPTION
1		MTB250-E
2	1121-0313	CHIP COMP 2mm
3	1121-0399	CHIP COMP 4,1mm
4	1121-0490	MINI-WAVE SSC 3,3mm
5	1121-0500	BENT CHISEL 1,6mm
6	1121-0499	CHISEL 1,6mm
7	1121-0357	CONICAL 0,40mm
8	1121-0475	FLAT BLADE 38,1mm
9	1121-0448	FLAT BLADE 25,4mm
10	1121-0473	FLAT BLADE 12,7mm
11	1121-0342	I.D. 1,02mm THERMODRIVE
12	1121-0368	I.D. 1,52mm THERMODRIVE
13	1121-0367	I.D. 0,76mm THERMODRIVE
14	1121-0507	I.D. 2.29mm THERMODRIVE
15	1121-0322-001	FLAT-PACK Tip 15.5x21.6 mm
16	1121-0445	PQFP-44/56 11,7X11,7 mm
17	1121-0484	PQFP-64/80 15,7X15,7mm
18	1121-0552	QFP160 Tip
19	1121-0317	PLCC-28 9,4mmX9,4mm
20	1121-0352	PLCC-32 12,2mmX9,65mm
21	6021-0007	Tip Ready Rack
22	6993-0151	Tip Cleaning Kit
23	6993-0153	Set vacuum cups

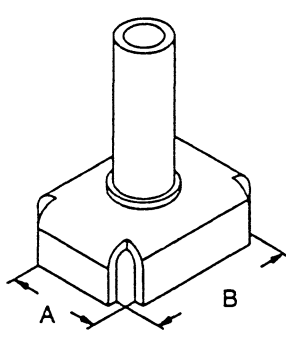
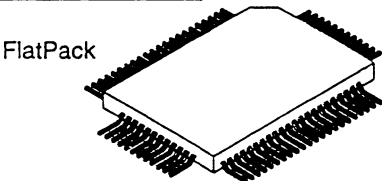
TP-65 THERMOPIK HANDPIECE

P/N 7024-0001

PACE has a wide variety of quick-change tips for the TP-65. Every ThermoPik Handpiece comes with three vacuum cups (1 small, 1 medium and 1 large). All tips must be ordered separately.

NOTE: To insure proper operation of the handpiece, be sure to use a Tip Maintenance Station (P/N 6993-0138).



TIP	DESCRIPTION	TIP SIZE A X B	PART NUMBER
 APPLICATION  FlatPack Note: The ThermoPik will also remove "Bumper-pack" components.	FlatPack Tip	0.61" x 0.85" (15.5mm x 21.6mm)	1121-0322-001
	FlatPack Tip	0.66" x 0.90" (16.8mm x 22.9mm)	1121-0322-002
	PQFP-68 Tip (bumper pack)	0.62" x 0.62" (15.7mm x 15.7mm)	1121-0323
	PQFP-64/80 Tip (non-bumper pack)	0.62" x 0.62" (15.7mm x 15.7mm)	1121-0484
	PQFP-84 Tip	0.72" x 0.72" (18.3mm x 18.3mm)	1121-0324
	PQFP-100 Tip	0.82" x 0.82" (20.8mm x 20.8mm)	1121-0325
	PQFP-132 Tip	1.02" x 1.02" (25.9mm x 25.9mm)	1121-0326
	PQFP-144	1.15" x 1.15" (29.2mm x 29.2mm)	1121-0456
	PQFP-160 Tip PQFP-208 Tip	1.22" x 1.22" (31.0mm x 31.0mm)	1121-0351
	PQFP-196	1.43" x 1.43" (36.3mm x 36.3mm)	1121-0483
NOTE: All dimensions are nominal, inside diameters. Consult your authorized PACE Distributor for sizes not listed			

NOTE: The TP-65 fits in the large bushing of either the Dual Handpiece Cubby (P/N 6019-0033) or the Dual Air-Handpiece Cubby (P/N 6019-0034). When using the PQFP-160 Tip (or larger), the TP-65 requires a special Cubby (P/N 6019-0037). For details, see the latest PACE "PRICE/PARTS BOOK".

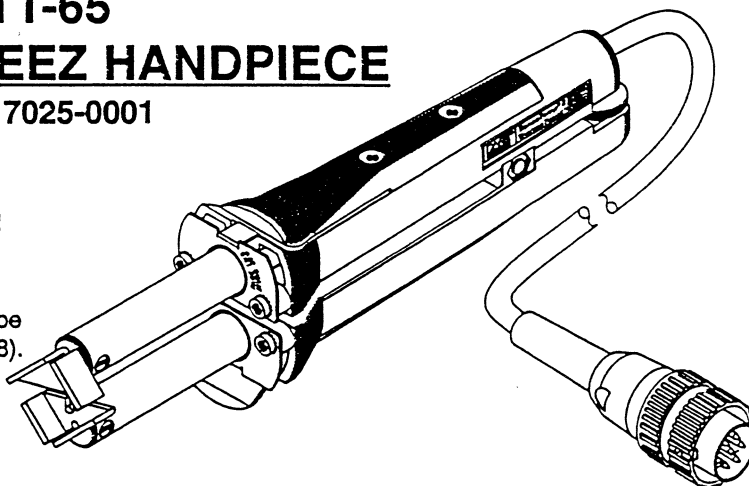
AVAILABLE VACUUM CUPS	SIZE	PART NUMBER
Small	0.175" (4.4mm)	1121-0382
Medium	0.300" (7.62mm)	1121-0383
Large	0.500" (12.7mm)	1121-0384
Kit (with one of each)	-----	6993-0153

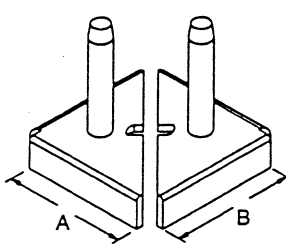
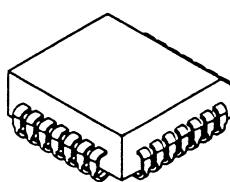
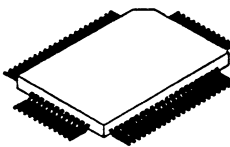
TT-65 THERMOTWEEZ HANDPIECE

P/N 7025-0001

PACE has a wide variety of quick-change tips for the TT-65. The TT-65 comes standard with MBT 250 and ST 50TT systems. All TT-65 tips must be ordered separately.

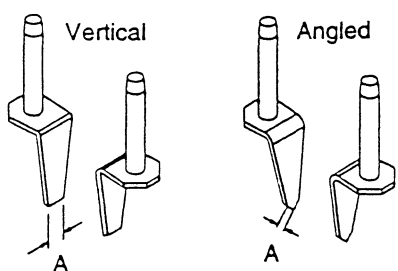
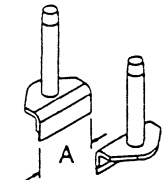
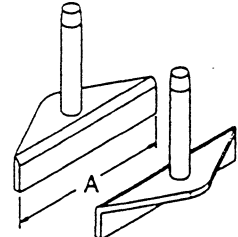
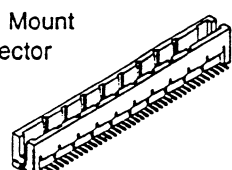
NOTE: To insure proper operation of the handpiece, be sure to use a Tip Maintenance Station (P/N 6993-0138).

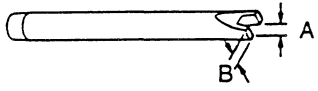
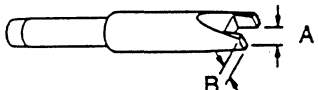
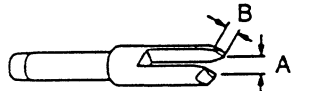
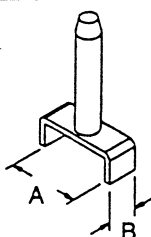
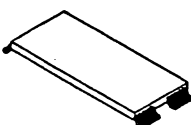
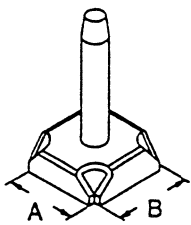
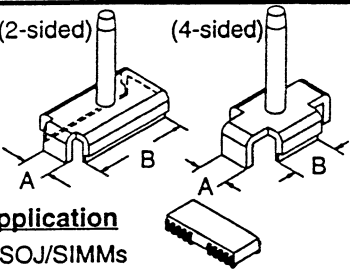
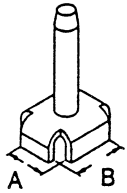


PLCC REMOVAL TIP	DESCRIPTION (suggested application)	TIP SIZE A x B	PART NUMBER
 Application  PLCC	PLCC-18	0.34" x 0.23" (8.64mm x 5.84mm)	1121-0314
	PLCC-20	0.27" x 0.27" (6.86mm x 6.86mm)	1121-0316
	PLCC-28	0.37" x 0.37" (9.4mm x 9.4mm)	1121-0317
	PLCC-28R	0.49" x 0.29" (12.4mm x 7.4mm)	1121-0492
	PLCC-32	0.48" x 0.38" (12.2mm x 9.65mm)	1121-0352
	PLCC-44 PQFP-84	0.57" x 0.57" (14.5mm x 14.5mm)	1121-0318
	PLCC-52 PQFP-100	0.67" x 0.67" (17.0mm x 17.0mm)	1121-0319
	PLCC-68 PQFP-132	0.86" x 0.86" (21.9mm x 21.9mm)	1121-0320
	PLCC-84 PQFP-160	1.06" x 1.06" (26.9mm x 26.9mm)	1121-0321
<i>The ThermoTweez can also remove leadless components (LCCCs) if sized correctly.</i>  PQFP	PLCC-100	1.31" x 1.31" (33.3mm x 33.3mm)	1121-0405
	PQFP-304	1.64" x 1.64" (41.7mm x 41.7mm)	1121-0491

NOTE: The TT-65 requires a ThermoTweez Cubby (P/N 6019-0035) which is sold separately.

TT-65 (cont.)

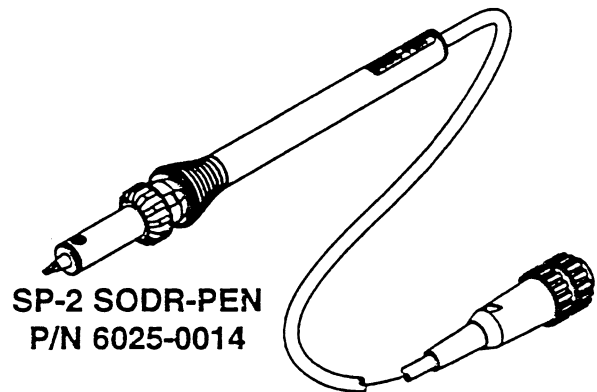
SURFACE MOUNT REMOVAL TIPS (for removal of chip components, SOICs, SOJ/SIMMs, and other 2-sided surface mount components)			
 Application Chip Component 	Chip Component (vertical)	A=0.03" (A=0.76mm)	1121-0398
	Chip Component (vertical)	A=0.08" (A=2.00mm)	1121-0313
	Chip Component (vertical)	A=0.16" (A=4.1mm)	1121-0399
	Chip Component (vertical) Small SOIC	A=0.25" (A=6.4mm)	1121-0401
	45° Angled Chip Component	A=0.10" (A=2.54mm)	1121-0436
 Application SOIC/SOJ/ SIMMs Module 	SOIC, SOJ/SIMMs Component (thin-walled tips)	A=0.5" (A=12.7mm)	1121-0473
		A=0.7" (A=17.8mm)	1121-0416
		A=0.8" (A=20.3mm)	1121-0497
		A=1.0" (A=25.4mm)	1121-0448
 Application Surface Mount Connector 	Surface Mount Connectors	A=1.25" (A=31.8mm) Extended blade Height	1121-0495
		A=1.5" (A=38.1mm)	1121-0475
		A=2.0" (A=50.8mm)	1121-0477
Note: All dimensions are nominal. NOTE: The TT-65 requires a ThermoTweez Cubby (P/N 6019-0035) which is sold separately.			

SURFACE MOUNT REMOVAL TIP	DESCRIPTION (suggested application)	TIP SIZE A X B	PART NUMBER
 	Chip Component 	0.093" x 0.080" (2.36mm x 2.03mm)	1121-0302
		0.14" x 0.08" (3.56mm x 2.03mm)	1121-0303
	SOT-23 	0.063" x 0.12" (1.6mm x 3.05mm)	1121-0304
	TSOP (Thin Small Outline Pkg.) 	0.60" x 0.25" (15.2mm x 6.35mm)	1121-0389
		0.76" x 0.32" (19.3mm x 8.13mm)	1121-0403
 <u>Application</u> Socket 	PLCC-28 Socket	0.45" x 0.45" (11.4mm x 11.4mm)	1121-0481
	PLCC-32 Socket	0.55" x 0.45" (14.0mm x 11.4mm)	1121-0429
	PLCC-44 Socket	0.65" x 0.65" (16.5mm x 16.5mm)	1121-0430
	PLCC-52 Socket	0.75" x 0.75" (19.1mm x 19.1mm)	1121-0431
	PLCC-68 Socket	0.95" x 0.95" (24.1mm x 24.1mm)	1121-0432
	PLCC-84 Socket	1.15" x 1.15" (29.2mm x 29.2mm)	1121-0482
 <u>Application</u> SOJ/SIMMs 	SOJ/SIMMs-18 (4-sided)	0.30" x 0.53" (7.62mm x 13.5mm)	1121-0458
	SOJ/SIMMs-20/24 (2-sided)	0.30" x 0.68" (7.62mm x 17.3mm)	1121-0460
 <u>Application</u> Small PQFP 	PQFP-32	0.33" x 0.33" (8.4mm x 8.4mm)	1121-0443
	PQFP-44/56	0.46" x 0.46" (11.7mm x 11.7mm)	1121-0445
	PQFP-44	0.46" x 0.5" (11.7mm x 12.7mm)	1121-0446

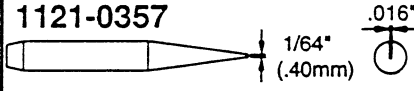
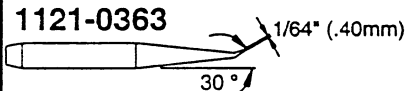
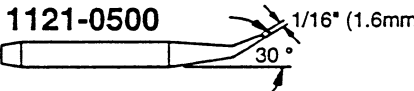
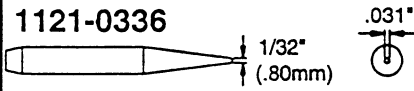
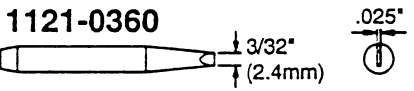
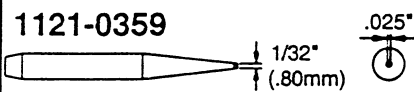
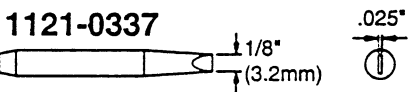
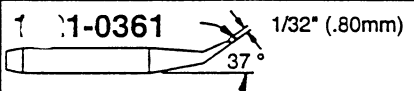
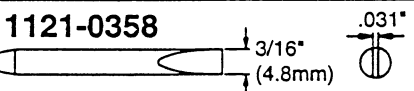
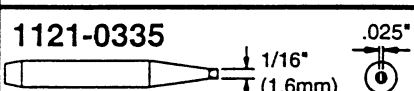
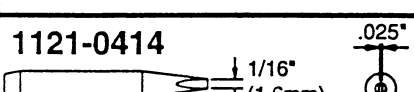
PACE TIPS

SP-2 SODR-PEN AND IR-70 HIGH CAPACITY SMT/THRU-HOLE SOLDERING IRON

PACE has a wide variety of quick-change tips for the SP-2 and IR-70 handpieces. Each SP-2 and IR-70 is shipped with a 1/16" Chisel (High Capacity) Tip (P/N 1121-0414). All SP-2 (and IR-70) tips have a 3/16" shank diameter.



TIPS WITH 3/16" SHANK DIAMETER

TIP (w/PART NUMBER)	TIP DESCRIPTION	TIP (w/PART NUMBER)	TIP DESCRIPTION
1121-0357 	1/64" Conical	1121-0499 	1/16" Chisel Extended Reach
1121-0363 	1/64" Bent Conical	1121-0500 	1/16" Bent Chisel Extended Reach
1121-0336 	1/32" Conical	1121-0360 	3/32" Chisel
1121-0359 	1/32" Chisel	1121-0337 	1/8" Chisel
1121-0361 	1/32" Bent Chisel	1121-0358 	3/16" Chisel
1121-0349 	1/16" Chisel (MicroFine)	1121-0406 	Single Sided Chisel
1121-0335 	1/16" Chisel	1121-0490 	Mini-Wave Single Sided Chisel
1121-0414 	1/16" Chisel (High Capacity)		

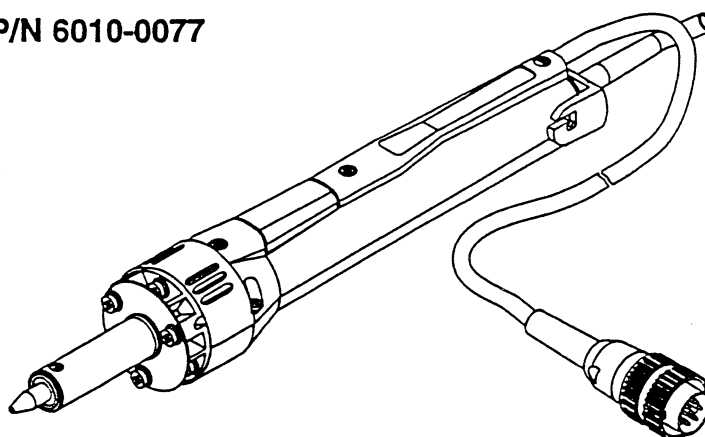
NOTE: The SP-2 requires an SP Tip & Tool Stand (P/N 6019-0043) which holds any 1 Sodr-Pen Handpiece, and must be ordered separately.

SODR-X-TRACTOR

P/N 6010-0077

PACE has a wide variety of quick-change tips for the SX-70 Sodr-X-Tractor Handpiece. Each SX-70 is shipped with a 0.04" I.D. tip (P/N 1121-0342).

A Tip Cleaning Kit is available that can be used with SX-70 Tips (P/N 6993-0151).



SX-70 THERMO-DRIVE DESOLDERING TIPS (3/16" Shank Diameter)		Outside Diameter	Inside Diameter	Part Number
		0.060" (1.52mm)	0.030" (0.76mm)	1121-0367
		0.070" (1.78mm)	0.040" (1.02mm)	1121-0342
		0.100" (2.54mm)	0.060" (1.52mm)	1121-0368
		0.190" (4.80mm)	0.090" (2.29mm)	1121-0507

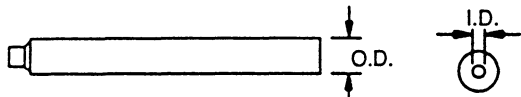
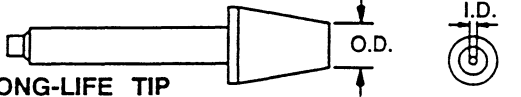
SX-70 EXTENDED REACH THERMO-DRIVE DESOLDERING TIPS (3/16" Shank Diameter)		Outside Diameter	Inside Diameter	Part Number
		0.060" (1.52mm)	0.030" (0.76mm)	1121-0505
		0.070" (1.78mm)	0.040" (1.02mm)	1121-0494
		0.100" (2.54mm)	0.060" (1.52mm)	1121-0506

Extended Reach Thermo-Drive Desoldering Tips have an extended nose for improved visibility and reach.

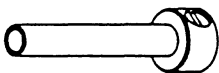
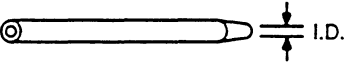
SX-70 LONG-LIFE DESOLDERING TIPS (3/16" Shank Diameter)		Outside Diameter	Inside Diameter	Part Number
		0.075" (1.91mm)	0.030" (0.76mm)	1121-0462
		0.085" (2.16mm)	0.040" (1.02mm)	1121-0463
		0.106" (2.69mm)	0.060" (1.52mm)	1121-0464

Long Life Desoldering Tips have an inner steel liner for added protection against oxidation and tip wear.

SODR-X-TRACTOR (cont.)

SX-70 FLO-D-SODR TIPS (3/16" Shank Diameter)	Outside Diameter	Inside Diameter	Part Number
	0.188" (4.77mm)	0.060" (1.52mm)	1121-0369
LONG-LIFE TIP 	0.196" (4.98mm)	0.060" (1.52mm)	1121-0465

Flo-D-Sodr Tips are used for safe, continuous Surface Mount land cleaning.

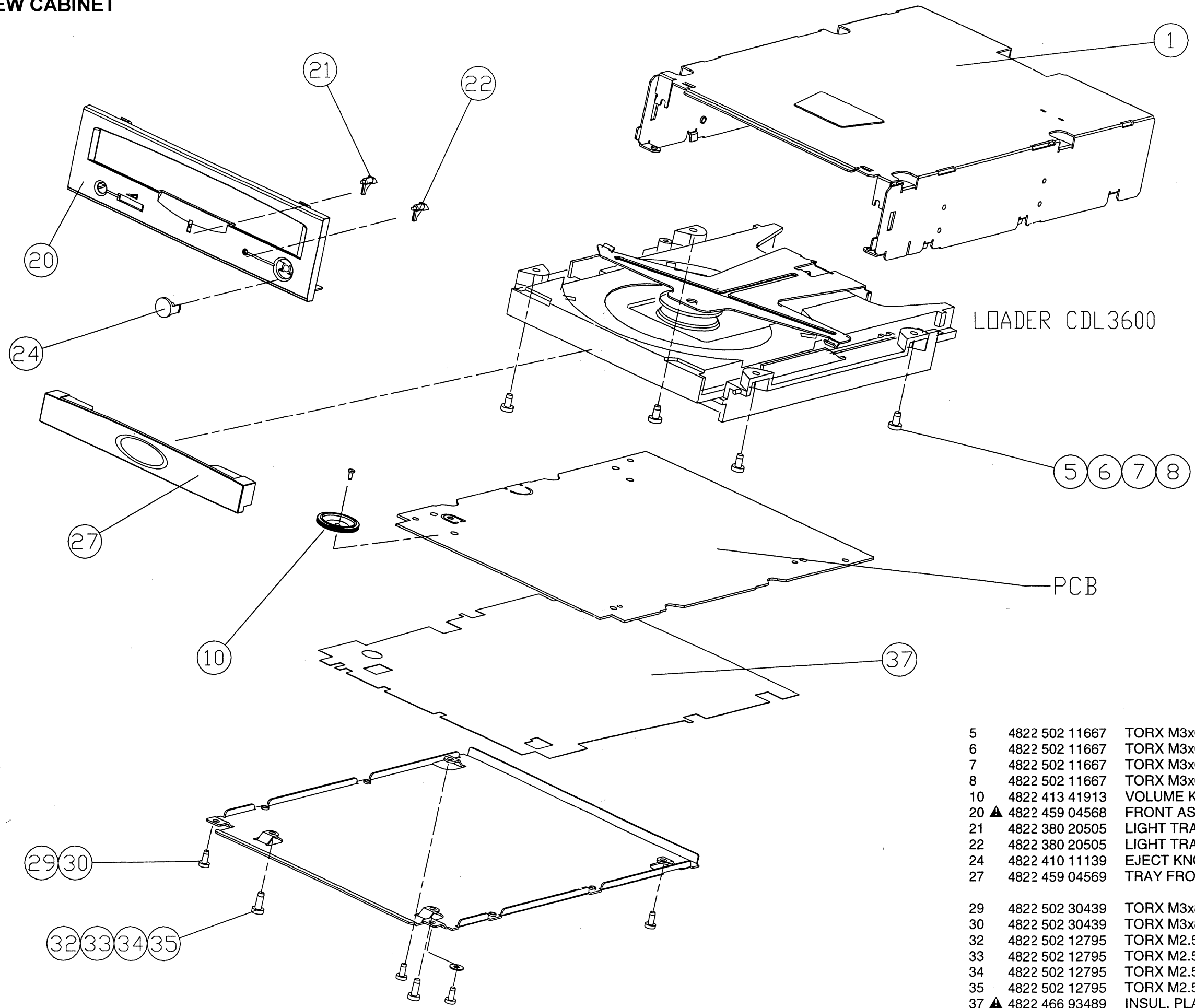
MICRO TIPS * (1/8" Shank Diameter)	Inside Diameter	Part Number
 ADAPTIP	Allows all 1/8" shank Micro Tips to be used with the SX-70 Sodr-X-Tractor.	1360-0083
	0.030" (0.76mm)	1121-0253
	0.030" (0.76mm) - Thin Wall	1121-0485
	0.040" (1.02mm)	1121-0254
	0.040" (1.02mm) - Thin Wall	1121-0486
	0.060" (1.52mm)	1121-0255
	0.030" (0.76mm)	1121-0261
	0.040" (1.02mm)	1121-0262
	0.060" (1.52mm)	1121-0267

* Note: Micro Tips can be used in the SX-65A, SX-55A, SX-40A, and SX-70 (with the AdapTip 1360-0083). The SX-55A and SX-40A are non-SensaTemp Handpieces.

Exploded View Cabinet
Exploded View Loader CDL3600
Exploded View CDM3600
Parts List

Chapter 7

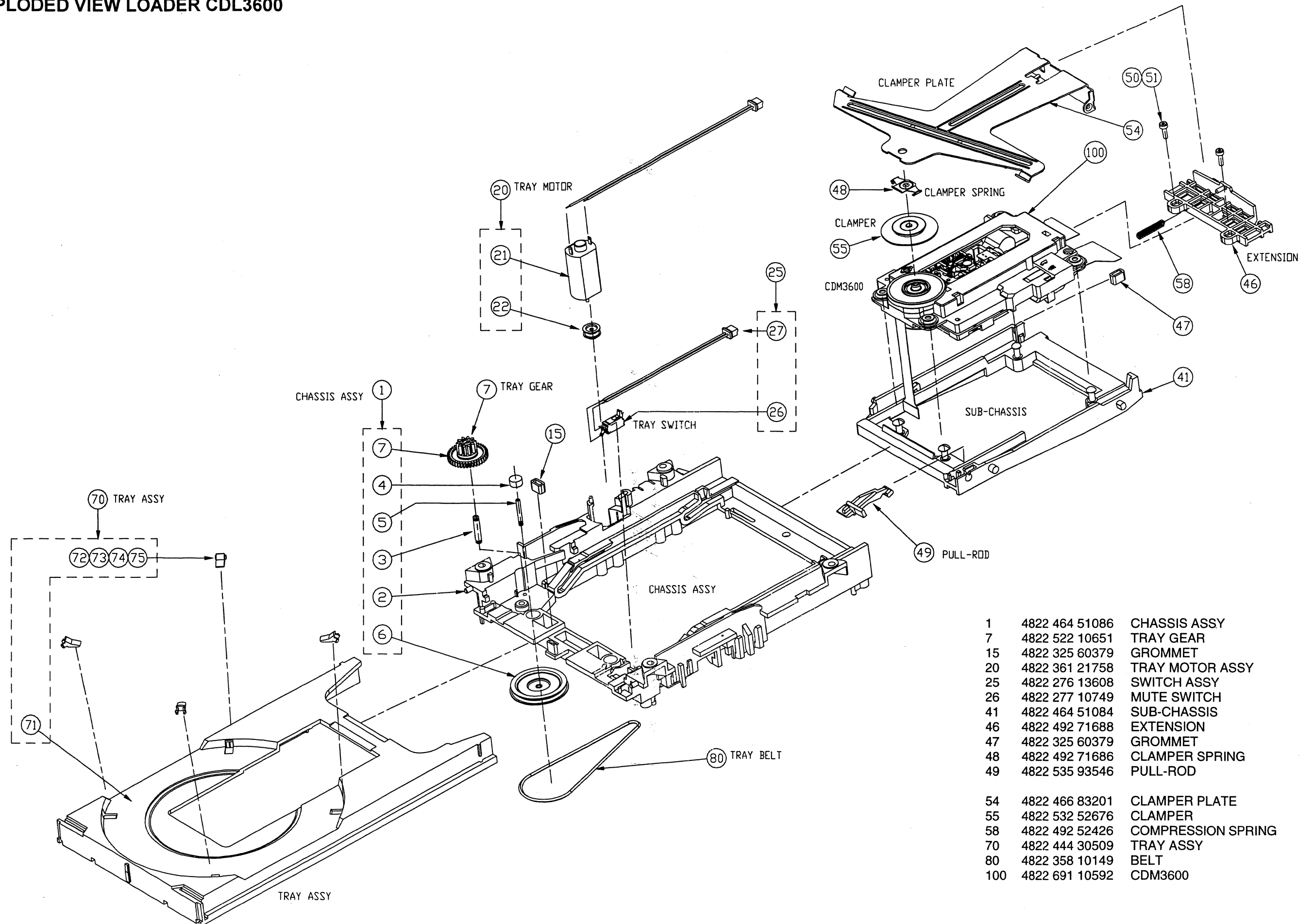
EXPLODED VIEW CABINET



LOADER CDL3600

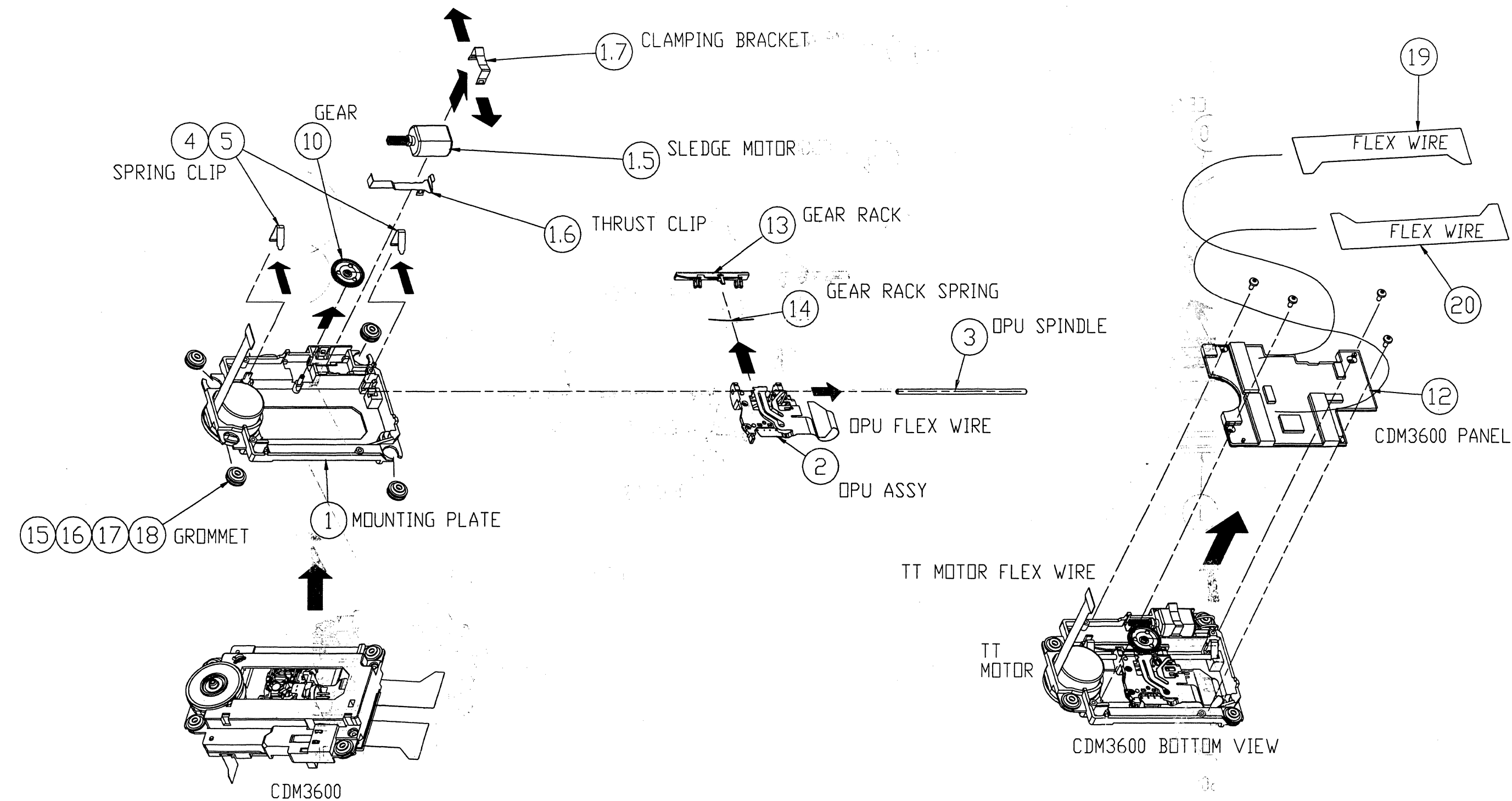
5	4822 502 11667	TORX M3x6
6	4822 502 11667	TORX M3x6
7	4822 502 11667	TORX M3x6
8	4822 502 11667	TORX M3x6
10	4822 413 41913	VOLUME KNOB
20 ▲	4822 459 04568	FRONT ASSY
21	4822 380 20505	LIGHT TRANSM.
22	4822 380 20505	LIGHT TRANSM.
24	4822 410 11139	EJECT KNOB (PINK)
27	4822 459 04569	TRAY FRONT ASSY
29	4822 502 30439	TORX M3x8
30	4822 502 30439	TORX M3x8
32	4822 502 12795	TORX M2.5x6
33	4822 502 12795	TORX M2.5x6
34	4822 502 12795	TORX M2.5x6
35	4822 502 12795	TORX M2.5x6
37 ▲	4822 466 93489	INSUL. PLATE

EXPLODED VIEW LOADER CDL3600



1	4822 464 51086	CHASSIS ASSY
7	4822 522 10651	TRAY GEAR
15	4822 325 60379	GROMMET
20	4822 361 21758	TRAY MOTOR ASSY
25	4822 276 13608	SWITCH ASSY
26	4822 277 10749	MUTE SWITCH
41	4822 464 51084	SUB-CHASSIS
46	4822 492 71688	EXTENSION
47	4822 325 60379	GROMMET
48	4822 492 71686	CLAMPER SPRING
49	4822 535 93546	PULL-ROD
54	4822 466 83201	CLAMPER PLATE
55	4822 532 52676	CLAMPER
58	4822 492 52426	COMPRESSION SPRING
70	4822 444 30509	TRAY ASSY
80	4822 358 10149	BELT
100	4822 691 10592	CDM3600

EXPLODED VIEW CDM3600



1	4822 464 51085	MOUNTING PLATE ASSY
1.5	4822 361 21759	SLEDGE MOTOR ASSY
1.6	4822 492 71687	THRUST SPRING
1.7	4822 402 61558	CLAMPING BRACKET
3	4822 535 93544	SPINDLE
4	4822 492 71685	SPRING CLIP
5	4822 492 71685	SPRING CLIP
10	4822 522 33567	GEAR
13	4822 522 33566	GEAR RACK

14	4822 492 71684	WIRE SPRING
15	4822 466 62637	SUSPENSION
16	4822 466 62637	SUSPENSION
17	4822 466 62637	SUSPENSION
18	4822 466 62637	SUSPENSION
19	4822 466 10691	FLEX FOIL CDM24 CONN
20	4822 466 10691	FLEX FOIL CDM24 CONN
29	4822 492 11305	SPRING O.T.
	4822 454 13244	OPU STICKER

Spare parts list / Stüklste / Liste des pièces

CDD3610			MAIN PCB					
CABINET PARTS								
5	4822 502 11667	TORX M3x6	4822 214 12308	MONO 3600 PACKED		2205 ▲	5322 122 32654	22nF 10% 63V
6	4822 502 11667	TORX M3x6	4822 252 51187	FUSE 0.5A		2206	4822 122 32627	2.7nF 10% 50V
7	4822 502 11667	TORX M3x6	1020 ▲	4822 252 51173	FUSE 1A	2207	5322 126 10465	3.9nF 10% 63V
8	4822 502 11667	TORX M3x6	1030	4822 252 11243	FUSE 1.25A	2208	5322 116 80853	560pF 5% 63V
10	4822 413 41913	VOLUME KNOB	1101	4822 267 60409	FLEX CONN. 22P	2210 ▲	5322 122 32654	22nF 10% 63V
20 ▲	4822 459 04568	FRONT ASSY	1102	4822 267 60409	FLEX CONN. 22P	2211	4822 124 80483	47µF 20% 6.3V
21	4822 380 20505	LIGHT TRANSM.	1143	4822 242 82075	CER.FIL. 16MHz	2212	5322 122 31946	27pF5% 63V
22	4822 380 20505	LIGHT TRANSM.	1177	4822 242 10557	32.00 MHz	2213	5322 122 31946	27pF5% 63V
24	4822 410 11139	EJECT KNOB (PINK)	1214	4822 242 10757	33.868 MHz	2214	5322 122 32452	47pF 5% 63V
27	4822 459 04569	TRAY FRONT ASSY	1290	4822 267 51454	FLEX CONN. 11P	2215 ▲	4822 122 33177	10nF 20% 50V
						2216 ▲	4822 122 33177	10nF 20% 50V
						2217 ▲	5322 122 32654	22nF 10% 63V
29	4822 502 30439	TORX M3x8	1331	4822 276 13202	SWITCH,PUSH	2218 ▲	5322 122 32654	22nF 10% 63V
30	4822 502 30439	TORX M3x8	1400	4822 242 10758	48 MHz	2219 ▲	5322 122 32654	22nF 10% 63V
32	4822 502 12795	TORX M2.5x6	1581	4822 265 10951	IDE CONN. 50P	2220 ▲	5322 122 32654	22nF 10% 63V
33	4822 502 12795	TORX M2.5x6	1670	4822 267 51223	HEADPHONE	2221 ▲	5322 122 32654	22nF 10% 63V
34	4822 502 12795	TORX M2.5x6				2222 ▲	5322 122 32654	22nF 10% 63V
35	4822 502 12795	TORX M2.5x6				2223	4822 124 80483	47µF 20% 6.3V
37 ▲	4822 466 93489	INSUL. PLATE				2224	4822 122 33496	100nF 10% 63V
	4822 736 15302	D.F.U. CDD3610				2227 ▲	4822 122 33342	33nF 10% 63V
						2228 ▲	4822 122 33342	33nF 10% 63V
						2229 ▲	4822 122 33177	10nF 20% 50V
LOADER CDL3600 MECHANICAL						2230 ▲	5322 122 32654	22nF 10% 63V
1	4822 464 51086	CHASSIS ASSY	2004	4822 124 41527	47µF 25V	2231 ▲	5322 122 32654	22nF 10% 63V
7	4822 522 10651	TRAY GEAR	2005	4822 124 41527	47µF 25V	2232	4822 126 13618	330pF 1% 63V
15	4822 325 60379	GROMMET	2008	4822 124 41528	100µF 25V	2233	4822 126 13618	330pF 1% 63V
20	4822 361 21758	TRAY MOTOR ASSY	2009	4822 124 41528	100µF 25V	2234	4822 126 13618	330pF 1% 63V
25	4822 276 13608	SWITCH ASSY	2013 ▲	4822 122 33177	10nF 20% 50V	2235 ▲	5322 122 32654	22nF 10% 63V
26	4822 277 10749	MUTE SWITCH	2015 ▲	4822 122 33177	10nF 20% 50V	2236	4822 126 13618	330pF 1% 63V
41	4822 464 51084	SUB-CHASSIS	2016	4822 124 41527	47µF 25V	2237	4822 126 13618	330pF 1% 63V
46	4822 492 71688	EXTENSION	2070 ▲	4822 122 33177	10nF 20% 50V	2238	4822 126 13618	330pF 1% 63V
47	4822 325 60379	GROMMET	2071 ▲	4822 122 33177	10nF 20% 50V	2239	4822 126 13618	330pF 1% 63V
48	4822 492 71686	CLAMPER SPRING	2072	4822 124 41527	47µF 25V			
49	4822 535 93546	PULL-ROD						
54	4822 466 83201	CLAMPER PLATE	2104	5322 122 32838	82nF 10% 63V	2240 ▲	5322 122 32654	22nF 10% 63V
55	4822 532 52676	CLAMPER	2105 ▲	5322 122 32654	22nF 10% 63V	2241	4822 126 13618	330pF 1% 63V
58	4822 492 52426	COMPRESSION SPRING	2106	4822 122 33496	100nF 10% 63V	2242 ▲	5322 122 32654	22nF 10% 63V
70	4822 444 30509	TRAY ASSY	2107	4822 124 80483	47µF 20% 6.3V	2243	4822 124 41527	47µF 25V
80	4822 358 10149	BELT	2108	5322 122 32838	82nF 10% 63V	2244 ▲	5322 122 32654	22nF 10% 63V
100	4822 691 10592	CDM3600	2109	4822 122 33325	470nF 16V	2245 ▲	5322 122 32654	22nF 10% 63V
			2110	4822 122 33325	470nF 16V	2246	4822 122 33496	100nF 10% 63V
			2111	5322 122 32838	82nF 10% 63V	2247	4822 124 80483	47µF 20% 6.3V
			2112	5322 122 32838	82nF 10% 63V	2255 ▲	5322 122 32654	22nF 10% 63V
			2113	4822 124 11353	1µF 20% 16V	2256 ▲	5322 122 32654	22nF 10% 63V
			2114	4822 124 11353	1µF 20% 16V			
			2115	4822 122 33325	470nF 16V	2262	4822 126 10326	180pF 5% 63V
			2116	4822 122 33325	470nF 16V	2267	4822 122 33496	100nF 10% 63V
			2117 ▲	5322 122 32654	22nF 10% 63V	2268	4822 122 33496	100nF 10% 63V
			2118 ▲	5322 122 32654	22nF 10% 63V	2270 ▲	5322 122 32654	22nF 10% 63V
			2119	5322 122 32838	82nF 10% 63V	2280 ▲	5322 122 32654	22nF 10% 63V
			2120 ▲	5322 122 32654	22nF 10% 63V	2281	5322 122 32658	22pF 5% 50V
			2130 ▲	5322 122 32654	22nF 10% 63V	2282 ▲	5322 122 32654	22nF 10% 63V
			2131	4822 124 80483	47µF 20% 6.3V	2283	4822 122 33496	100nF 10% 63V
			2132 ▲	5322 122 32654	22nF 10% 63V	2284 ▲	5322 122 32654	22nF 10% 63V
			2134	4822 122 33575	220pF 5% 50V	2285	4822 122 33496	100nF 10% 63V
			2135	4822 122 33575	220pF 5% 50V			
			2136	4822 122 33575	220pF 5% 50V	2286	5322 122 32658	22pF 5% 50V
			2138	4822 122 33575	220pF 5% 50V	2287	5322 122 32658	22pF 5% 50V
			2139	5322 116 80853	560pF 5% 63V	2288	4822 122 31981	33nF +0.5pF 50V
			2140 ▲	5322 122 32654	22nF 10% 63V	2292	4822 122 31981	33nF +0.5pF 50V
			2156 ▲	5322 126 10223	4.7nF 10% 63V	2296	4822 122 31981	33nF +0.5pF 50V
			2157 ▲	5322 122 32654	22nF 10% 63V	2297	4822 122 33496	100nF 10% 63V
			2170 ▲	5322 122 32654	22nF 10% 63V	2300 ▲	5322 122 32654	22nF 10% 63V
			2171	4822 124 41527	47µF 25V	2306 ▲	5322 122 32654	22nF 10% 63V
						2307	4822 122 33496	100nF 10% 63V
			2172	4822 122 33891	3.3nF 10% 63V	2308	4822 122 33496	100nF 10% 63V
			2173	4822 122 33891	3.3nF 10% 63V			
			2174	4822 122 33891	3.3nF 10% 63V	2320 ▲	5322 122 32654	22nF 10% 63V
			2175 ▲	5322 122 34123	1nF 10% 50V	2400 ▲	5322 122 32654	22nF 10% 63V
			2176	4822 122 33496	100nF 10% 63V	2401 ▲	5322 122 32654	22nF 10% 63V
			2177	5322 122 32659	33pF 5% 50V	2402 ▲	5322 122 32654	22nF 10% 63V
			2178	5322 122 32659	33pF 5% 50V	2403 ▲	5322 122 32654	22nF 10% 63V
			2179	4822 122 33496	100nF 10% 63V	2406 ▲	5322 122 32654	22nF 10% 63V
			2180 ▲	5322 122 32654	22nF 10% 63V	2407 ▲	5322 122 32654	22nF 10% 63V
			2181 ▲	5322 122 32654	22nF 10% 63V	2414 ▲	5322 122 32654	22nF 10% 63V
						2508	5322 122 32452	47pF 5% 63V
			2182 ▲	5322 122 32654	22nF 10% 63V	2509	5322 122 32452	47pF 5% 63V
			2183	4822 122 33496	100nF 10% 63V			
			2184 ▲	4822 122 33177	10nF 20% 50V	2510	5322 122 32452	47pF 5% 63V
			2193 ▲	4822 122 33177	10nF 20% 50V	2511	5322 122 32452	47pF 5% 63V
			2194 ▲	4822 122 33177	10nF 20% 50V	2512	5322 122 32452	47pF 5% 63V
			2200	4822 122 32646	5.6nF 10% 50V	2513	5322 122 32452	47pF 5% 63V
			2203 ▲	5322 122 32654	22nF 10% 63V	2514	5322 122 32452	47pF 5% 63V
			2204 ▲	5322 122 32654	22nF 10% 63V			

Spare parts list / Stükliste / Liste des pièces

2515	4822 124 41596	22µF 20% 50V
2516 ▲	5322 122 32654	22nF 10% 63V
2520 ▲	4822 122 33177	10nF 20% 50V
2605	4822 124 80483	47µF 20% 6.3V
2606 ▲	5322 122 32654	22nF 10% 63V
2611	4822 122 32139	12pF 2% 63V
2612	5322 122 32531	100pF 5% 50V
2613	4822 126 10326	180pF 5% 63V
2615 ▲	5322 122 32654	22nF 10% 63V
2616	4822 122 32139	12pF 2% 63V
2617	4822 126 10326	180pF 5% 63V
2618	5322 122 32531	100pF 5% 50V
2630 ▲	5322 122 32654	22nF 10% 63V
2631	4822 124 11484	2.2µF 20% 10V
2636	4822 124 11484	2.2µF 20% 10V
2645 ▲	5322 122 32654	22nF 10% 63V
2646 ▲	5322 122 32654	22nF 10% 63V
2650	4822 122 33175	2.2nF 20% 50V
2655	4822 122 33175	2.2nF 20% 50V
2660	4822 122 33175	2.2nF 20% 50V
2665	4822 122 33175	2.2nF 20% 50V
2680 ▲	5322 122 32654	22nF 10% 63V

3009	4822 117 10833	10k 1% 0.1W
3010	4822 051 20101	100Ω 5% 0.1W
3011	4822 051 20392	3k9 5% 0.1W
3012	4822 051 20471	470Ω 5% 0.1W
3015	4822 051 10102	1k 2% 0.25W
3016	4822 051 10102	1k 2% 0.25W
3017 ▲	4822 117 11151	1Ω 5% (FUSE 1206)
3108 ▲	4822 051 20472	4k7 5% 0.1W
3109	4822 051 20473	47k 5% 0.1W
3111	4822 051 20184	180k 5% 0.1W
3112	4822 051 20474	470k 5% 0.1W
3120	4822 051 20273	27k 5% 0.1W
3121	4822 051 20474	470k 5% 0.1W
3122	4822 051 20223	22k 5% 0.1W
3123	4822 051 20223	22k 5% 0.1W
3124	4822 051 20333	33k 5% 0.1W
3133	4822 051 20105	1M 5% 0.1W
3134	4822 051 20333	33k 5% 0.1W
3135 ▲	4822 051 20163	15k 5% 0.1W
3136	4822 117 10833	10k 1% 0.1W
3137 ▲	4822 051 20153	15k 5% 0.1W
3138	4822 117 10833	10k 1% 0.1W
3139 ▲	4822 051 20752	7k5 5% 0.1W
3140	4822 051 20473	47k 5% 0.1W
3142	4822 117 10833	10k 1% 0.1W
3143	4822 051 20105	1M 5% 0.1W
3144	4822 117 10833	10k 1% 0.1W
3149	4822 117 11449	2k2 5% 0.1W
3152	4822 051 20104	100k 5% 0.1W
3153	4822 051 10102	1k 2% 0.25W
3154	4822 051 10102	1k 2% 0.25W
3155	4822 051 20105	1M 5% 0.1W
3156	4822 051 20101	100Ω 5% 0.1W
3157	4822 051 20101	100Ω 5% 0.1W
3158	4822 051 20101	100Ω 5% 0.1W
3160	4822 051 20223	22k 5% 0.1W
3161	4822 051 20105	1M 5% 0.1W
3162	4822 051 20105	1M 5% 0.1W
3163	4822 051 20393	39k 5% 0.1W
3164	4822 051 20223	22k 5% 0.1W
3165	4822 051 20101	100Ω 5% 0.1W
3166	4822 051 20393	39k 5% 0.1W
3168	4822 051 20101	100Ω 5% 0.1W
3169	4822 051 20101	100Ω 5% 0.1W
3171	4822 051 20681	680Ω 5% 0.1W
3172	4822 051 20105	1M 5% 0.1W
3173	4822 051 20101	100Ω 5% 0.1W
3174	4822 051 20101	100Ω 5% 0.1W
3175	4822 051 20101	100Ω 5% 0.1W
3176	4822 051 20101	100Ω 5% 0.1W
3177	4822 051 20101	100Ω 5% 0.1W
3178	4822 051 20223	22k 5% 0.1W

3179	4822 051 20101	100Ω 5% 0.1W
3180	4822 117 10833	10k 1% 0.1W
3181	4822 051 20562	5k6 5% 0.1W
3182	4822 051 20562	5k6 5% 0.1W
3183 ▲	4822 051 20472	4k7 5% 0.1W
3184	4822 051 20101	100Ω 5% 0.1W
3185	4822 051 20101	100Ω 5% 0.1W
3190	4822 117 10833	10k 1% 0.1W
3191	4822 051 20562	5k6 5% 0.1W
3192	4822 051 20562	5k6 5% 0.1W
3193 ▲	4822 051 20472	4k7 5% 0.1W
3194	4822 051 20101	100Ω 5% 0.1W
3195	4822 051 20101	100Ω 5% 0.1W
3196 ▲	5322 117 11726	10Ω 5% (FUSE 1206)
3201	4822 051 20223	22k 5% 0.1W
3202	4822 051 20393	39k 5% 0.1W
3203 ▲	4822 051 20109	10Ω 5% 0.1W
3204	4822 051 20821	820Ω 5% 0.1W
3205	4822 051 20331	330Ω 5% 0.1W
3208 ▲	4822 051 20229	22Ω 5% 0.1W
3209	4822 051 20223	22k 5% 0.1W
3210	4822 051 20393	39k 5% 0.1W
3211 ▲	4822 051 20109	10Ω 5% 0.1W
3212	4822 051 20821	820Ω 5% 0.1W
3213 ▲	4822 051 20472	4k7 5% 0.1W
3214	4822 051 20105	1M 5% 0.1W
3215	4822 117 10833	10k 1% 0.1W
3216	4822 051 20101	100Ω 5% 0.1W
3217	4822 051 20101	100Ω 5% 0.1W
3218	4822 051 20101	100Ω 5% 0.1W
3219	4822 051 20101	100Ω 5% 0.1W
3220	4822 051 20101	100Ω 5% 0.1W
3221 ▲	4822 051 20472	4k7 5% 0.1W
3222	4822 051 20101	100Ω 5% 0.1W
3223 ▲	4822 051 20229	22Ω 5% 0.1W
3224	4822 051 10102	1k 2% 0.25W
3225	4822 051 10102	1k 2% 0.25W
3226	4822 051 20821	820Ω 5% 0.1W
3227	4822 051 20561	560Ω 5% 0.1W
3228	4822 117 10833	10k 1% 0.1W
3229	4822 117 10833	10k 1% 0.1W
3230 ▲	4822 051 20472	4k7 5% 0.1W
3231	4822 117 11751	16k 1% (0805)
3232	4822 117 11145	4k7 1% 0.1W
3233	4822 117 10839	130k 1% 0.1W
3234	4822 117 10833	10k 1% 0.1W
3235	4822 117 11751	16k 1% (0805)
3236	4822 117 11145	4k7 1% 0.1W
3237	4822 117 10833	10k 1% 0.1W
3238	4822 117 10833	10k 1% 0.1W
3239	4822 117 10839	130k 1% 0.1W
3240	4822 117 10839	130k 1% 0.1W
3241 ▲	4822 051 20472	4k7 5% 0.1W
3242	4822 051 20105	1M 5% 0.1W
3243	4822 051 20564	560k 5% 0.1W
3244	4822 117 11449	2k2 5% 0.1W
3245	4822 051 20104	100k 5% 0.1W
3246	4822 051 20394	390k 5% 0.1W
3247	4822 117 11503	220Ω 1% 0.1W
3248	4822 051 20223	22k 5% 0.1W
3249	4822 051 20104	100k 5% 0.1W
3250	4822 051 20101	100Ω 5% 0.1W
3251	4822 051 20223	22k 5% 0.1W
3252	4822 051 20223	22k 5% 0.1W
3253	4822 051 20223	22k 5% 0.1W
3254 ▲	4822 051 20472	4k7 5% 0.1W
3255	4822 117 11449	2k2 5% 0.1W
3256	4822 051 20339	33Ω 5% 0.1W
3257	4822 051 20339	33Ω 5% 0.1W
3258 ▲	4822 051 20008	0Ω JUMPER (0805)
3259	4822 117 10833	10k 1% 0.1W
3260	4822 117 11139	1k5 1% 0.1W
3261	4822 117 11449	2k2 5% 0.1W
3262	4822 051 20101	100Ω 5% 0.1W
3263	4822 051 20473	47k 5% 0.1W
3264	4822 051 10102	1k 2% 0.25W
3265	4822 051 10102	1k 2% 0.25W

3266	4822 051 10102	1k 2% 0.25W
3267	4822 117 10833	10k 1% 0.1W
3268	4822 051 20392	3k9 5% 0.1W
3269	4822 051 10102	1k 2% 0.25W
3270	4822 117 10833	10k 1% 0.1W
3271	4822 117 10833	10k 1% 0.1W
3272	4822 117 10833	10k 1% 0.1W
3273	4822 051 10102	1k 2% 0.25W
3274	4822 117 10965	18k 1% 0.1W
3275	4822 051 20223	22k 5% 0.1W
3276	4822 051 20223	22k 5% 0.1W
3277	4822 051 20223	22k 5% 0.1W
3279	4822 051 10102	1k 2% 0.25W
3280	4822 051 10102	1k 2% 0.25W
3281	4822 051 10102	1k 2% 0.25W
3282	4822 051 10102	1k 2% 0.25W
3283	4822 051 10102	1k 2% 0.25W
3284	4822 051 10479	47Ω 2% 0.25W
3285	4822 051 20562	5k6 5% 0.1W
3286	4822 051 20562	5k6 5% 0.1W
3287	4822 051 10102	1k 2% 0.25W
3288	4822 051 10102	1k 2% 0.25W
3289	4822 051 10479	47Ω 2% 0.25W
3290	4822 051 20562	5k6 5% 0.1W
3291	4822 051 20562	5k6 5% 0.1W
3292	4822 051 10102	1k 2% 0.25W
3293	4822 051 10102	1k 2% 0.25W
3294	4822 051 10479	47Ω 2% 0.25W
3295	4822 051 20562	5k6 5% 0.1W
3296	4822 051 20562	5k6 5% 0.1W
3297	4822 117 11503	220Ω 1% 0.1W
3298	4822 117 11503	220Ω 1% 0.1W
3299 ▲	4822 051 20229	22Ω 5% 0.1W
3300	4822 117 11503	220Ω 1% 0.1W
3301	4822 117 10833	10k 1% 0.1W
3302 ▲	4822 051 20472	4k7 5% 0.1W
3303	4822 117 10833	10k 1% 0.1W
3304	4822 117 11503	220Ω 1% 0.1W
3305 ▲	4822 051 20472	4k7 5% 0.1W
3306 ▲	4822 051 20008	0Ω JUMPER (0805)
3307 ▲	4822 051 20008	0Ω JUMPER (0805)
3308	4822 117 10833	10k 1% 0.1W
3309 ▲	4822 051 20008	0Ω JUMPER (0805)
3310	4822 117 10833	10k 1% 0.1W
3311	4822 117 10833	10k 1% 0.1W
3312 ▲	4822 051 20008	0Ω JUMPER (0805)
3315 ▲	4822 051 20008	0Ω JUMPER (0805)
3317 ▲	4822 051 20472	4k7 5% 0.1W
3318	4822 117 11503	220Ω 1% 0.1W
3321 ▲	4822 051 20008	0Ω JUMPER (0805)
3323 ▲	4822 051 20008	0Ω JUMPER (0805)
3325 ▲	4822 051 20008	0Ω JUMPER (0805)
3400	4822 117 10833	10k 1% 0.1W
3401	4822 117 10833	10k 1% 0.1W
3402	4822 117 10833	10k 1% 0.1W
3403	4822 117 10833	10k 1% 0.1W
3404	4822 051 20479	47Ω 5% 0.1W
3405	4822 051 20479	47Ω 5% 0.1W
3406	4822 051 20479	47Ω 5% 0.1W
3407	4822 051 20479	47Ω 5% 0.1W
3408	4822 051 20479	47Ω 5% 0.1W
3409	4822 051 20479	47Ω 5% 0.1W
3410	4822 051 20479	47Ω 5% 0.1W
3411	4822 051 20479	47Ω 5% 0.1W
3412	4822 051 20479	47Ω 5% 0.1W
3413	4822 051 20479	47Ω 5% 0.1W
3414	4822 051 20479	47Ω 5% 0.1W
3415	4822 051 20479	47Ω 5% 0.1W
3416	4822 051 20479	47Ω 5% 0.1W
3417	4822 051 20479	47Ω 5% 0.1W
3418	4822 051 20479	47Ω 5% 0.1W
3419	4822 051 20479	47Ω 5% 0.1W
3420	4822 051 20479	47Ω 5% 0.1W
3421	4822 051 20479	47Ω 5% 0.1W
3422	4822 051 20479	47Ω 5% 0.1W
3423	4822 051 20479	47Ω 5% 0.1W

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3424	4822 051 20479	47Ω 5% 0.1W
3425	4822 051 20479	47Ω 5% 0.1W
3426	4822 051 20479	47Ω 5% 0.1W
3427	4822 051 20479	47Ω 5% 0.1W
3428	4822 051 20479	47Ω 5% 0.1W
3429	4822 051 20479	47Ω 5% 0.1W
3430	4822 117 10833	10k 1% 0.1W
3434	4822 051 20479	47Ω 5% 0.1W
3436	4822 117 10833	10k 1% 0.1W
3437	4822 051 20479	47Ω 5% 0.1W
3438	4822 051 20008	0Ω JUMPER (0805)
3503	4822 117 10833	10k 1% 0.1W
3504	4822 051 20153	15k 5% 0.1W
3505	4822 051 20479	47Ω 5% 0.1W
3506	4822 117 10833	10k 1% 0.1W
3507	4822 051 20479	47Ω 5% 0.1W
3508	4822 051 20479	47Ω 5% 0.1W
3509	4822 051 20479	47Ω 5% 0.1W
3510	4822 051 20479	47Ω 5% 0.1W
3511	4822 051 20479	47Ω 5% 0.1W
3512	4822 051 20479	47Ω 5% 0.1W
3513	4822 117 10833	10k 1% 0.1W
3514	4822 117 10833	10k 1% 0.1W
3515	4822 117 10833	10k 1% 0.1W
3516	4822 117 10833	10k 1% 0.1W
3517	4822 117 10833	10k 1% 0.1W
3518	4822 117 10833	10k 1% 0.1W
3519	4822 117 10833	10k 1% 0.1W
3520	4822 117 10833	10k 1% 0.1W
3521	4822 117 10833	10k 1% 0.1W
3523	4822 117 10833	10k 1% 0.1W
3524	4822 051 20101	100Ω 5% 0.1W
3605	4822 051 20101	100Ω 5% 0.1W
3611	4822 051 20223	22k 5% 0.1W
3612	4822 051 20153	15k 5% 0.1W
3613	4822 117 10833	10k 1% 0.1W
3614	4822 117 11383	12k 1% 0.1W
3616	4822 051 20223	22k 5% 0.1W
3617	4822 051 20153	15k 5% 0.1W
3618	4822 117 10833	10k 1% 0.1W
3619	4822 117 11383	12k 1% 0.1W
3631	4822 051 20223	22k 5% 0.1W
3632	4822 051 20471	470Ω 5% 0.1W
3636	4822 051 20223	22k 5% 0.1W
3637	4822 051 20471	470Ω 5% 0.1W
3647	4822 101 30881	POTM CARB LOG 10k
3650	4822 117 10833	10k 1% 0.1W
3651	4822 051 20273	27k 5% 0.1W
3652	4822 051 20121	120Ω 5% 0.1W
3660	4822 117 10833	10k 1% 0.1W
3661	4822 051 20273	27k 5% 0.1W
3662	4822 051 20121	120Ω 5% 0.1W
3681	4822 051 20008	0Ω JUMPER (0805)
3900	4822 051 20008	0Ω JUMPER (0805)
3901	4822 051 20008	0Ω JUMPER (0805)
3902	4822 051 20008	0Ω JUMPER (0805)
3903	4822 051 20008	0Ω JUMPER (0805)
3904	4822 051 20008	0Ω JUMPER (0805)
3905	4822 051 10008	0Ω 5% 0.25W
3906	4822 051 10008	0Ω 5% 0.25W
3908	4822 051 20008	0Ω JUMPER (0805)
3911	4822 051 20008	0Ω JUMPER (0805)
3915	4822 051 20008	0Ω JUMPER (0805)
3916	4822 051 20008	0Ω JUMPER (0805)
3920	4822 051 20008	0Ω JUMPER (0805)
5005	4822 242 82201	DSS306 22nF 16V
5006	4822 242 82201	DSS306 22nF 16V
5008	4822 157 10964	COIL
5016	4822 157 71659	100mH 15%
5070	4822 157 71206	COIL EMI 100MHz 600Ω
5071	4822 157 10964	COIL
5104	4822 157 71659	100mH 15%
5105	4822 157 71206	COIL EMI 100MHz 600Ω
5106	4822 157 71658	27mH 15%
5107	4822 157 71658	27mH 15%
5108	4822 157 71658	27mH 15%
5109	4822 157 71658	27mH 15%
5110	4822 157 71659	100mH 15%
5111	4822 157 71659	100mH 15%
5130	4822 157 71206	COIL EMI 100MHz 600Ω
5132	4822 157 71206	COIL EMI 100MHz 600Ω
5170	4822 157 71206	COIL EMI 100MHz 600Ω
5176	4822 157 71206	COIL EMI 100MHz 600Ω
5179	4822 157 71206	COIL EMI 100MHz 600Ω
5210	4822 157 71206	COIL EMI 100MHz 600Ω
5223	4822 157 71206	COIL EMI 100MHz 600Ω
5245	4822 157 71206	COIL EMI 100MHz 600Ω
5255	4822 157 71206	COIL EMI 100MHz 600Ω
5300	4822 157 71206	COIL EMI 100MHz 600Ω
5301	4822 157 71206	COIL EMI 100MHz 600Ω
5302	4822 157 71206	COIL EMI 100MHz 600Ω
5304	4822 157 71206	COIL EMI 100MHz 600Ω
5320	4822 157 71206	COIL EMI 100MHz 600Ω
5400	4822 157 71206	COIL EMI 100MHz 600Ω
5403	4822 157 71206	COIL EMI 100MHz 600Ω
5404	4822 157 71206	COIL EMI 100MHz 600Ω
5405	4822 157 71206	COIL EMI 100MHz 600Ω
5406	4822 157 71206	COIL EMI 100MHz 600Ω
5408	4822 157 71206	COIL EMI 100MHz 600Ω
5409	4822 157 71206	COIL EMI 100MHz 600Ω
5500	4822 157 71206	COIL EMI 100MHz 600Ω
5600	4822 157 71206	COIL EMI 100MHz 600Ω
5615	4822 157 71206	COIL EMI 100MHz 600Ω
5630	4822 157 71206	COIL EMI 100MHz 600Ω
5645	4822 157 71206	COIL EMI 100MHz 600Ω
5646	4822 157 71206	COIL EMI 100MHz 600Ω
5647	4822 157 71206	COIL EMI 100MHz 600Ω
5649	4822 157 71206	COIL EMI 100MHz 600Ω
5650	4822 242 10756	DSS306 220pF 20% 100V
5660	4822 242 10756	DSS306 220pF 20% 100V
6005	4822 130 81512	LLZ-C6V2
6006	4822 130 81222	LLZ-C15
6012	4822 130 31928	BAS16
6013	5322 130 32076	BAT16
6014	4822 130 33996	BZX84-C9V1
6016	4822 130 83916	MBSR140T3
6120	4822 130 80622	BAT54
6140	5322 130 80214	BAS28
6155	4822 130 80622	BAT54
6185	5322 130 80214	BAS28
6285	5322 130 80214	BAS28
6290	5322 130 80214	BAS28
6295	5322 130 80214	BAS28
6312	4822 130 83915	TLMV3100
6317	4822 130 83917	TLMO3100
6501	4822 130 31928	BAS16
7010	4822 130 60142	BC869
7012	5322 130 41982	BC848B
7015	5322 130 41982	BC848B
7105	4822 209 15602	SZA1010T/K1
7120	5322 130 44787	BFR31
7121	5322 130 41983	BC858B
7130	4822 209 33421	OQ8845T/K3
7150	4822 209 30732	LM319D
7170	4822 209 14785	SERVO U CONTROLLER
7182	5322 130 41983	BC858B
7183	4822 130 60142	BC869
7185	5322 130 61569	BC868
7192	5322 130 41983	BC858B
7193	4822 130 60142	BC869
7195	5322 130 61569	BC868
7200	5322 130 41982	BC848B
7205	4822 209 60792	74HC4053D
7209	5322 130 41982	BC848B
7210	4822 209 90073	GXCT38307CB16
7223	5322 130 42718	BFS20
7224	4822 130 60383	BF824
7225	5322 130 42718	BFS20
7230	5322 209 61482	74HC4066D
7235	4822 209 30095	LM833D
7245	4822 209 33417	TDA1371H/N1
7270	4822 209 31615	LM324AD
7271	5322 130 41982	BC848B
7272	5322 130 41983	BC858B
7280	4822 209 60792	74HC4053D
7282	4822 209 31615	LM324AD
7285	5322 209 61482	74HC4066D
7286	5322 130 41982	BC848B
7287	5322 130 41983	BC858B
7288	4822 130 60142	BC869
7289	5322 130 61569	BC868
7290	5322 130 41982	BC848B
7291	5322 130 41983	BC858B
7292	4822 130 60142	BC869
7293	5322 130 61569	BC868
7294	5322 130 41982	BC848B
7295	5322 130 41983	BC858B
7296	4822 130 60142	BC869
7297	5322 130 61569	BC868
7300	4822 209 15601	P80C32IBBB
7303	5322 209 73181	74HCT373D
7304	4822 209 12712	UM8264DM-70LL
7305	4822 900 11065	FIRMWARE 3610
7310	5322 130 41983	BC858B
7311	5322 130 41983	BC858B
7315	5322 130 42012	BC858A
7320	4822 209 15603	PALCE 16V8H-10JC
7400	4822 209 15604	OTI-975
7402	4822 209 15574	UPD424400LA-60
7403	4822 209 15574	UPD424400LA-60
7501	5322 209 60299	PC74HCT00T
7600	4822 209 33411	MC78L05ACD
7605	4822 209 32196	TDA1311AT/N2
7615	4822 209 30095	LM833D
7645	4822 209 31963	TCA0372DW
7650	5322 209 11596	PC74HCT08T