

Service
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Product Service Group CE Audio

Service Information

Already published Service Informations :

CHANGES DURING PRODUCTION

FRONT BOARD

*From production week 0217 onwards the following has been changed to solve Thin/Thick Disc readability problem and to improve on the Tape transition timings.

Change 7400 3139 110 53251 TMP87CS71F - 'MZ9S53251'

*From production week 0225 onwards the following has been changed due to material end of life.

Change 7402 9322 140 83682 IC M24C01-BN6

ETF7 ND/DD/FR TAPE MODULE

*From production week 0218 onwards the ETF7 ND/DD/FR Tape Module is introduced to replace the ETF5-FE ND/DD/FR Tape Module for cost savings. For this reason new layout and circuit drawing are enclosed (Page 9-1 to 9-14).

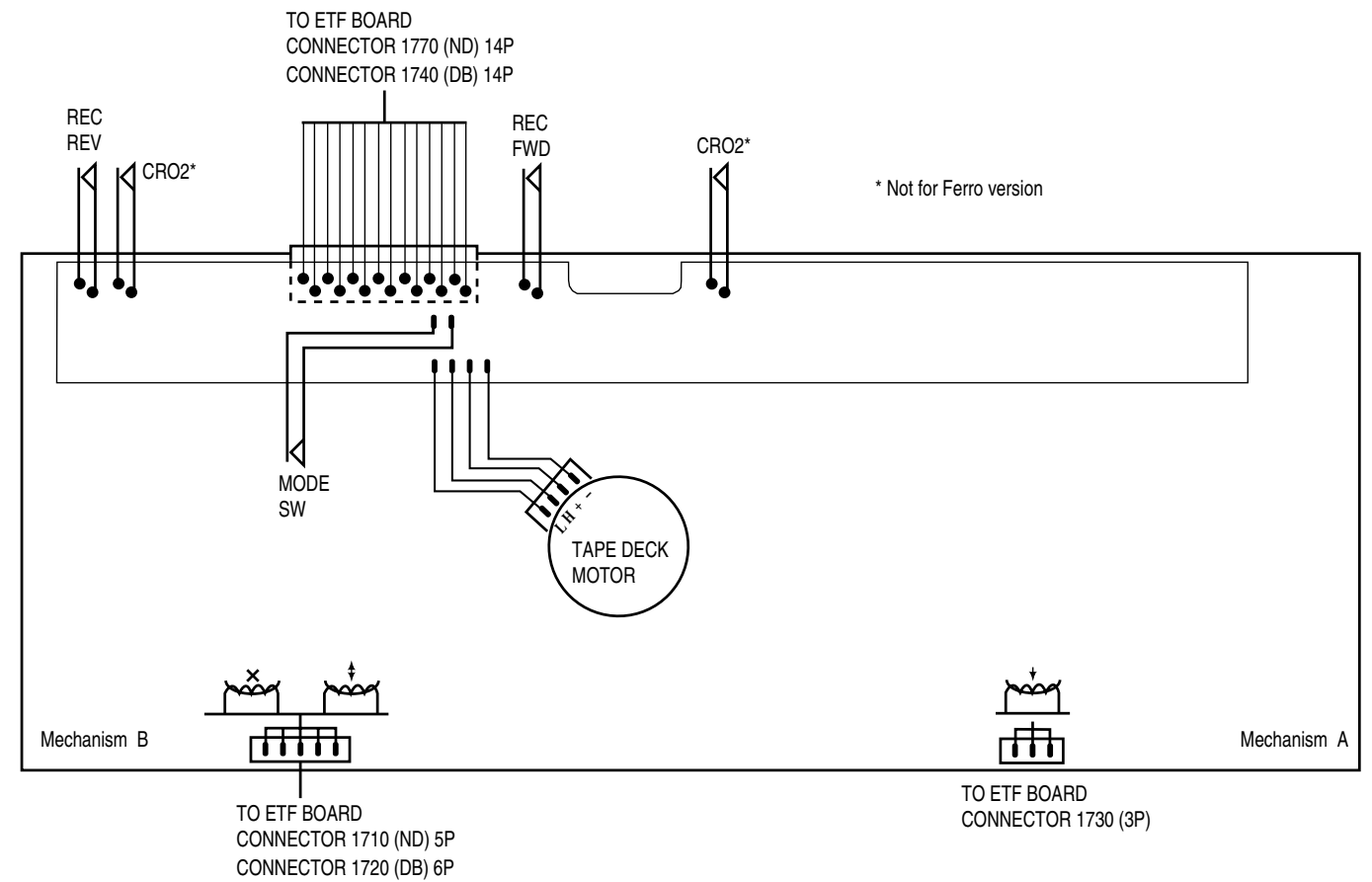
ETF7 TAPE MODULE

(Non-Dolby Version)

TABLE OF CONTENTS

Tape Module Wiring & variation table 9-1
 Block diagram 9-2
 Brief Introduction 9-3
 Connector assignment 9-4
 Tape deck electronics & Tape adjustments 9-5
 ETF7 Non-Dolby board layouts 9-6
 Analog Circuit diagram 9-7
 Servo Circuit diagram 9-8
 Exploded views & parts list 9-9
 Electrical parts list 9-13

Tapedeck wiring (Double deck)

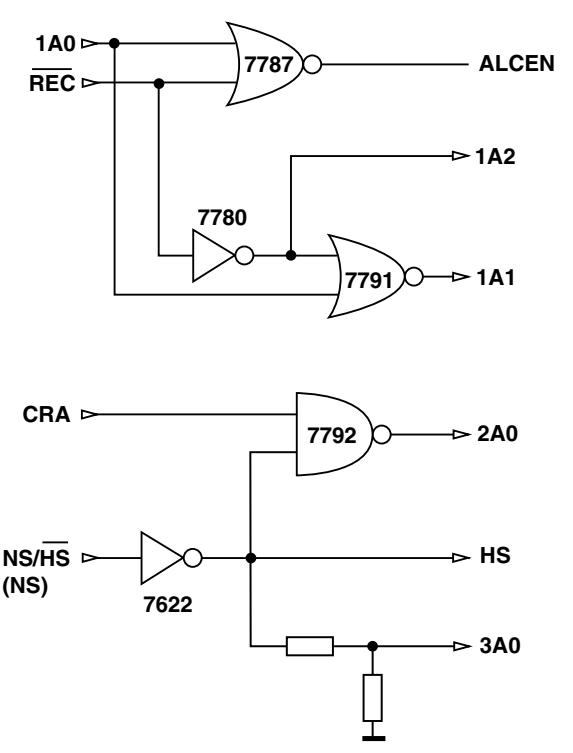
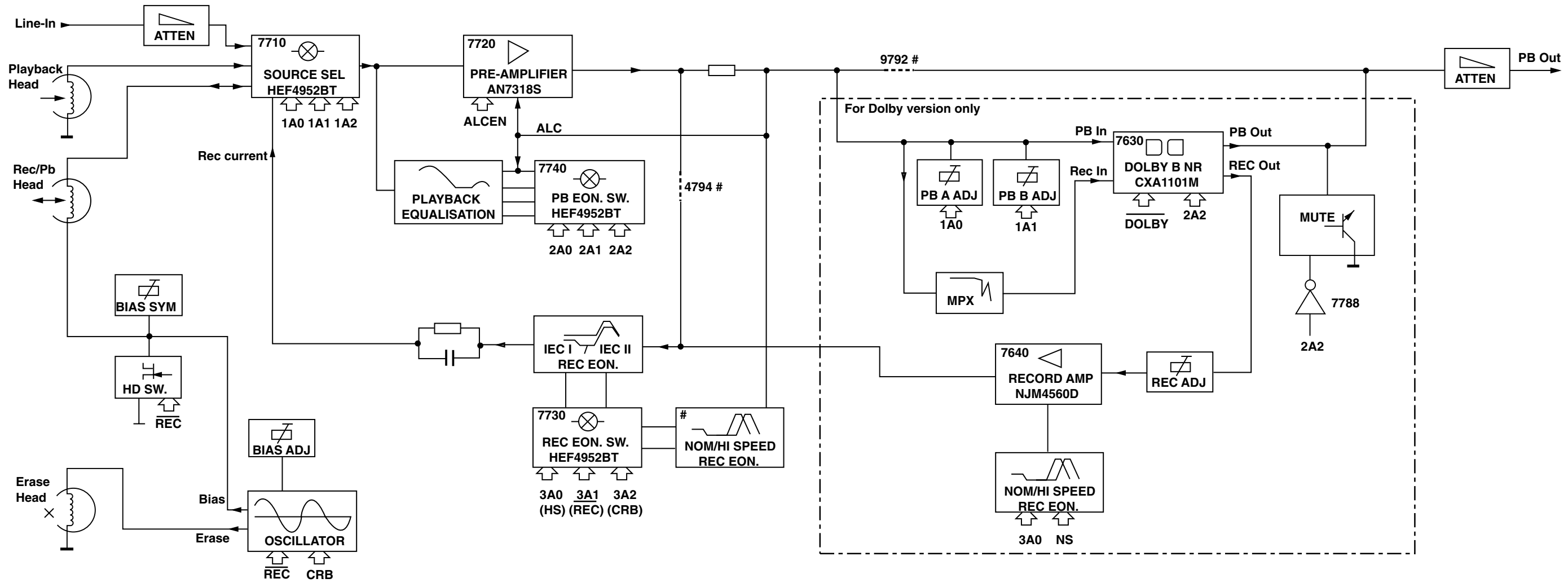


Variations table for Analog Circuit

	Autoreverse	Non-autoreverse	
	ND/DD/FR	ND/DD/FF	FF
	Chrome/Ferro	Chrome/Ferro	Ferro
2624	-	-	100nF
2701 , 2702	150pF	270pF	270pF
2703 , 2704	100pF	220pF	220pF
2717 , 2718	10nF	15nF	15nF
2721 , 2722	6,8nF	6,8nF	-
2727 , 2728	470pF	1nF	1nF
3616	10k	1k	1k
3618	6k8	-	-
3620	10k trimmer	-	-
3622	-	10k trimmer	10k trimmer
3672	4k7	-	-
3676	47k	-	-
3687	220R	220R	-
3688	680R	-	-
3723 , 3724	15k	18k	18k
3725 , 3726	10R	10R	-
3727 , 3728	5k6	6k8	6k8
3729 , 3730	3k3	4k7	4k7
3743 , 3744	1k5	2k2	2k2
3745 , 3746	3k3	5k6	5k6
3754 , 3755	1M	47R	47R

	Autoreverse	Non-autoreverse	
	ND/DD/FR	ND/DD/FF	FF
	Chrome/Ferro	Chrome/Ferro	Ferro
3769	12k	8k2	8k2
3772	6k8	5k6	5k6
4785	-	-	0R jumper
3774	15k	8k2	8k2
6614	1N4148	-	-
7616	BC857B	-	-
7622	BC847B	-	-

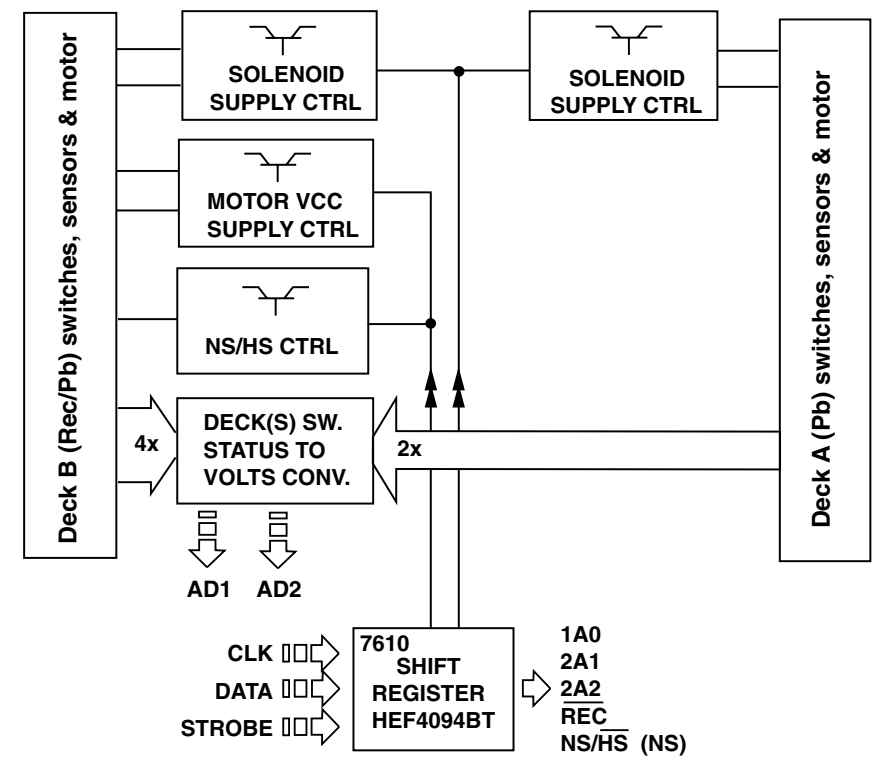
BLOCK DIAGRAM



NOTE: # For Non-dolby version only
Only 1 channel is presented.

MicroProcessor Control / Communication lines

Direct / Indirect Control lines from Shift Registers



Brief introduction

General

1. Playback Mode
Signal from the playback head Deck A or Deck B is selected and fed through by the Mode Selector IC7710 (HEF4952BT). The signal is amplified by amplifier IC7720 (AN7323S) before feeding to the IC7740 (HEF4952BT) and out to the AF Board via connector 1701.
2. Recording Mode
Recording Signal is selected and fed through by the Mode Selector IC7710 (HEF4952BT) which is then amplified by the amplifier IC7720 (AN7323S). The amplified output signal will pass through IC7730 (HEF4952BT) for record equalization and back to IC7710 (HEF4952BT) before registered into the Rec/PB Head of Deck B.
3. Dubbing Mode
In Dubbing mode, signal from the playback head Deck A is selected and fed through by the Mode Selector IC7710 (HEF4952BT) which is then equalised for playback mode by the amplifier IC7720 (AN7323S) so that a flat response is obtained after the pre-amp. The equalised signal will then follow the same path as in the Recording mode.
4. Mode Selector
The Mode Selector IC7710 (HEF4952BT) caters for 4 inputs signal, namely Playback Signal from Deck A, Playback Signal from Deck B, Recording Signal and Dubbing Signal.
5. Amplifier PB/REC
Amplifier IC7720 (AN7323S) is for the purpose of amplifying the Playback and Recording signal from the Mode Selector.
6. Automatic Level Control (ALC)
ALC circuit consists of resistors (3760, 3765, 3766, 3767), capacitors (2762, 2763) and control by transistor 7787 (BC847B). ALC limits the amplifier output to a constant value when input signal becomes too large, thus limiting recording current to below saturation level, to prevent recording distortion.
7. Muting Circuit (For Non-Dolby version only)
Switch S4 of the IC7740 (HEF4952BT) is for the purpose of muting the output during Recording mode. During Recording mode, S4 is closed and shorted to the ground.
8. IC7740 (HEF4952BT)
The function of the IC7740 (HEF4952BT) is to change time constant between 120us Ferro (IEC I) and 70us Chrome (IEC II) during playback mode. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II). This IC will switch to Flat Gain during the Recording mode.
9. IC7730 (HEF4952BT)
The function of the IC7730 (HEF4952BT) is to change gain and time constant according to tape type and recording speed to boost recording current at higher frequency during recording to compensate for head loss. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II).
10. Bias Level
Bias Level making use of the Variable resistor (3773) for adjusting the optimal level of the bias current for Ferro or Chrome.
11. Bias Symm (For Dolby B NR version only)
Bias Symm making use of the Variable resistor (3785) to adjust the bias current for the left and the right channel to be equal.
12. PB Switch
Playback Switch which consists of the FETs 7785 (For Dolby B NR version only) & 7786 (J111) is for the purpose of providing a virtual ground for the Rec/PB Head (Deck B) during Playback mode. During the Playback mode, the FETs are turn on and shorted pin 2 and 4 of connector 1720 to the ground. During Recording mode, the FETs are turn off to allow the oscillator signal to be superposition onto the Recording signal for recording.

13. Motor Speed (For FR versions only)
During High speed dubbing, a feedback signal from the uP through pin 03 of the IC7610 (HEF4094BT) will trigger the transistors 7622 (BC847B) and 7616 (BC857B) to cause a change in the voltage level between High and Low, thus changing the speed of the motor.
14. IC7610 (HEF4094BT)
IC7610 (HEF4094BT) is a Shift Register use for issues the logic for cmos switch ICs (HEF4952BT) via 1A0, 2A1 and 2A2. It also issues logic to On/Off SOL_A, SOL_B and MOT. Recording speed is controlled via NS/HS.

Dolby Circuit (For sets with Dolby B NR version only)

15. IC7630 (CXA1551M)
IC7630 (CXA1551M) in the Dolby circuit is a Dolby Noise Reduction Type B IC for the Playback and Recording signal. Noise Reduction ON/OFF are controlled by DOLBY, which is from CLK, direct from uP. After clocking in DATA, CLK is set to HIGH/LOW for NR OFF/ON.
16. 19kHz Filter
The 19kHz filters 5631 & 5632 (LXD-210) in the Dolby circuit is for the purpose of filtering the 19kHz Pilot Tone (for Tuner signal only) of the Recording signal.
17. Level Adjust
The Variable resistor 3635, 3636, 3641 and 3642 in the Dolby circuit is for adjusting the playback level of the Dolby reference (400Hz, 200nWb/m). Transistor 7631, 7632 are ON to enable adjustment of 3641, 3642 during Playback Deck A. Transistor 7633, 7634 and 3635, 3636 are active for Playback Deck B.
18. Amplifier IC7640 (NJM4560M)
The Amplifiers 7640A & 7640B (NJM4560M) in the Dolby circuit is for the purpose of amplified the Recording signal.
19. Muting Circuit
The muting circuit which consists of transistors 7788, 7789 and 7790 (BC847B) is for the purpose of muting the output during Recording mode.

NOTATIONS & ABBREVIATIONS USED IN THIS DOCUMENT

CR	Chrome (IEC type II)
DB	Dolby NR type B
DD	Double Deck
DM	Double Motor
FE	Ferro (IEC type I)
FF	Non-Autoreverse
FR	Autoreverse Deck B
Gnd x	Ground x
HSD	High speed dubbing
ND	Non Dolby
NR	Noise Reduction
NSD	Normal speed dubbing
PB	Playback
REC	Record
S/A	Sub-assy
SD	Single Deck
SM	Single Motor

CONNECTORS ASSIGNMENTS:**CONNECTOR 1701 INTERCONNECTION TO AF BOARD**

○ 1	REC-L	Record input left
○ 2	REC-R	Record input right
○ 3	GND A	AF Ground
○ 4	TAPE-L	Playback output left
○ 5	+12V	D.C. supply (+12V) for AF electronics
○ 6	TAPE-R	Playback output right
○ 7	-CMOS	Negative d.c. supply (-9V) for CMOS ICs

CONNECTOR 1703 INTERCONNECTION TO AF BOARD

○ 1	GND M	Motor Ground
○ 2	+MOTOR	D.C. supply (+12V) for tape deck motor & solenoid

CONNECTOR 1706 INTERCONNECTION TO FRONT BOARD

○ 1	AD2	Deck sensing switches output voltage / Deck A EOT
○ 2	AD1	Deck sensing switches output voltage / Deck B EOT
○ 3	+5V	DC supply +5V for ADC network
○ 4	GND P	Control & Oscillator Ground
○ 5	CLK	HEF4094BT shift register Clock line
○ 6	DATA	HEF4094BT shift register Data line
○ 7	STROBE	HEF4094BT shift register Strobe line

CONNECTOR 1710 DECK B HEADS CONNECTOR (For Non-Dolby version only)

○ 1	B R/P HD L+	R/P Head left channel positive
○ 2	GND A	R/P Head return ground
○ 3	B R/P HD R+	R/P Head right channel positive
○ 4	ERASE HEAD	Erase Head
○ 5	GND A	Erase Head ground

CONNECTOR 1720 DECK B HEADS CONNECTOR (For Dolby B NR version only)

○ 1	B R/P HD L+	R/P Head left channel positive
○ 2	B R/P HD L-	R/P Head left channel negative
○ 3	B R/P HD R+	R/P Head right channel positive
○ 4	B R/P HD R-	R/P Head right channel negative
○ 5	ERASE HEAD	Erase Head
○ 6	GND A	Erase Head ground

CONNECTOR 1730 DECK A HEAD CONNECTIONS (For Double Deck versions only)

○ 1	A PB HD L+	Pb Head left channel positive
○ 2	GND A	Pb Head return ground shield
○ 3	A PB HD R+	Pb Head right channel positive

CONNECTOR 1740

○ 1	REC REW
○ 2	CrO2 B
○ 3	REC FWD
○ 4	PHOTO B
○ 5	SOL B
○ 6	Vcc
○ 7	MODE B
○ 8	GND M
○ 9	SOL A
○ 10	PHOTO A
○ 11	MODE A
○ 12	L
○ 13	CrO2 A
○ 14	H

CONNECTOR 1770

○ 1	REC REW
○ 2	CrO2 B
○ 3	REC FWD
○ 4	PHOTO B
○ 5	SOL B
○ 6	Vcc
○ 7	MODE B
○ 8	GND M
○ 9	SOL A
○ 10	PHOTO A
○ 11	MODE A
○ 12	L
○ 13	CrO2 A
○ 14	H

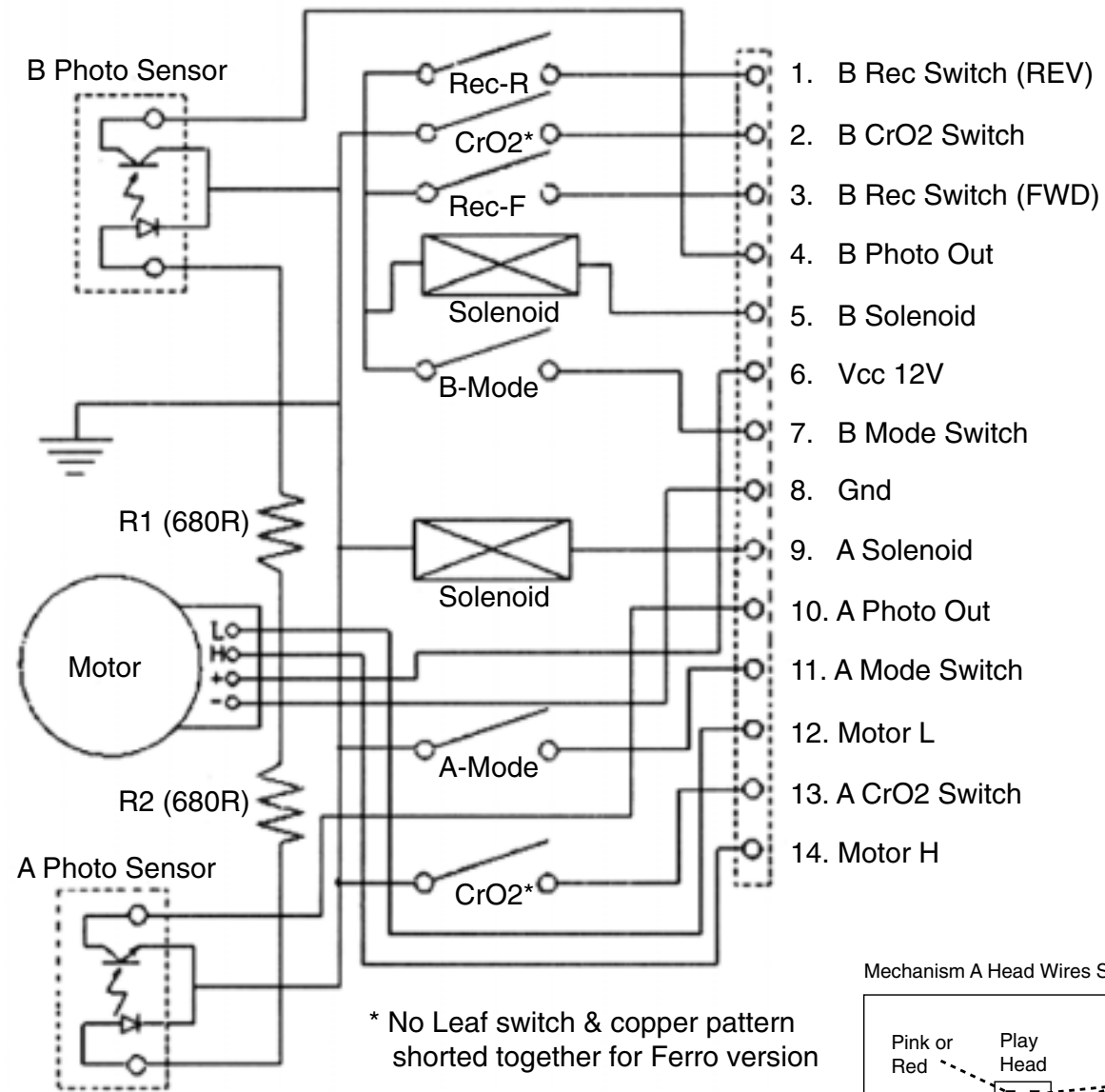
DECK A & B CONTROL INTERFACE (For Dolby B NR version only)

○ 1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
○ 2	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
○ 3	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
○ 4	PHOTO B	Photo sensor output (tape movement indication)	
○ 5	SOL B	Solenoid supply for deck B	
○ 6	Vcc	Deck / Motor supply	
○ 7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
○ 8	GND M	Deck / Motor ground	
○ 9	SOL A	Solenoid supply for deck A	
○ 10	PHOTO A	Photo sensor output (tape movement indication)	
○ 11	MODE A	Mode switch (head engagement)	[open=off: close=engaged]
○ 12	L	L pin for motor	
○ 13	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
○ 14	H	H pin for motor	

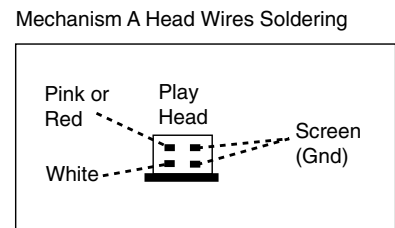
DECK A & B CONTROL INTERFACE (For Non-Dolby version only)

○ 1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
○ 2	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
○ 3	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
○ 4	PHOTO B	Photo sensor output (tape movement indication)	
○ 5	SOL B	Solenoid supply for deck B	
○ 6	Vcc	Deck / Motor supply	
○ 7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
○ 8	GND M	Deck / Motor ground	
○ 9	SOL A	Solenoid supply for deck A	
○ 10	PHOTO A	Photo sensor output (tape movement indication)	
○ 11	MODE A	Mode switch (head engagement)	[open=off: close=engaged]
○ 12	L	L pin for motor	
○ 13	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
○ 14	H	H pin for motor	

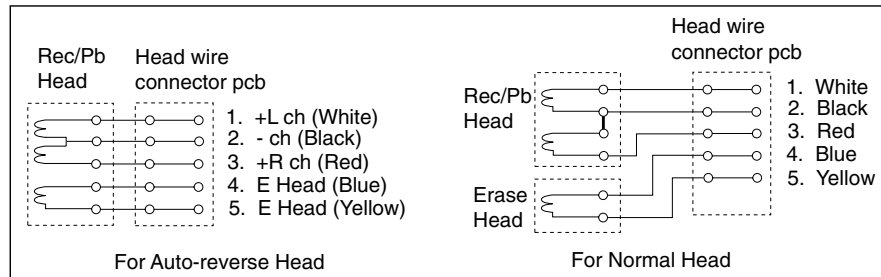
TAPE MECHANISM ELECTRONICS



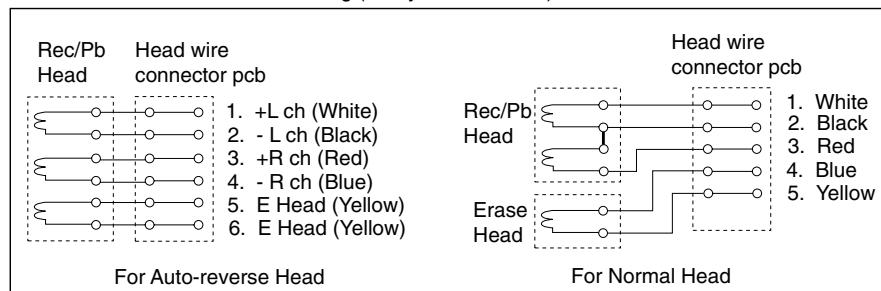
* No Leaf switch & copper pattern shorted together for Ferro version



Mechanism B Head Wires Soldering (Non-Dolby version)



Mechanism B Head Wires Soldering (Dolby B NR version)

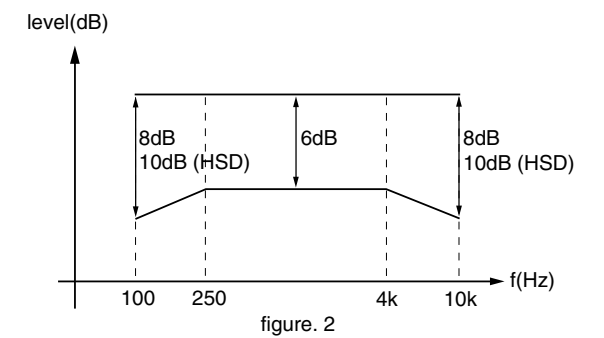
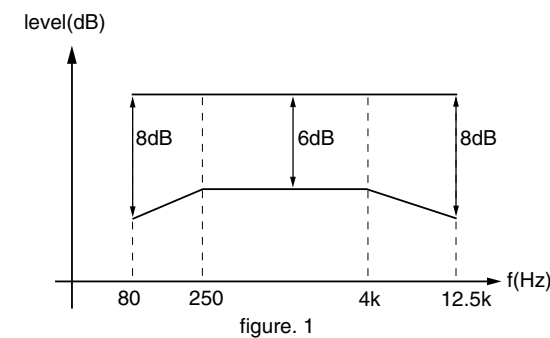


TAPE ADJUSTMENT & CHECK TABLE

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST MOTOR SPEED						
NORMAL SPEED	SBC420 3150Hz	PLAY B	1 or 2	frequency counter	3620	3150Hz +/- 0.5%
		PLAY A	LEFT RIGHT		check	3150Hz -0.8/+1.8%
CHECK WOW & FLUTTER						
DECK A & B	SBC420 3150Hz	PLAY	1 or 2	W&F-meter	check	<0.4 % DIN
ADJUST AZIMUTH						
DECK A & B	SBC420 10kHz	PLAY FWD	1 or 2	mV-meter	left hand screw	max. output level & left=right
		PLAY REV #	LEFT RIGHT		right hand screw	
CHECK PLAYBACK FREQUENCY RESPONSE						
DECK A & B	SBC420	PLAY	1 or 2	mV-meter	check	limits see fig.1
ADJUST BIAS CURRENT						
DECK B	SBC419A^	RECORD	5 or 6	mV-meter	3773	995mV
	SBC420		LEFT RIGHT		check	750mV +/- 1.5dB
CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION						
Inject 3mV signals 100Hz, 250Hz, 1kHz, 10kHz, 12.5kHz via 3 or 4	SBC419A^ or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	1 or 2	mV-meter	check	limits see fig. 2 *
Inject 1kHz 8.85mV via 3 or 4	SBC419A^ or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	1 or 2	THD-meter	check	<3% *

SBC419A^: 4822 397 30069
SBC420 : 4822 397 30071

For Auto-reverse version only
* If high frequencies are not within limits, decrease bias and re-measure. If distortion is too high, increase bias and re-measure
^ Not applicable for Ferro version

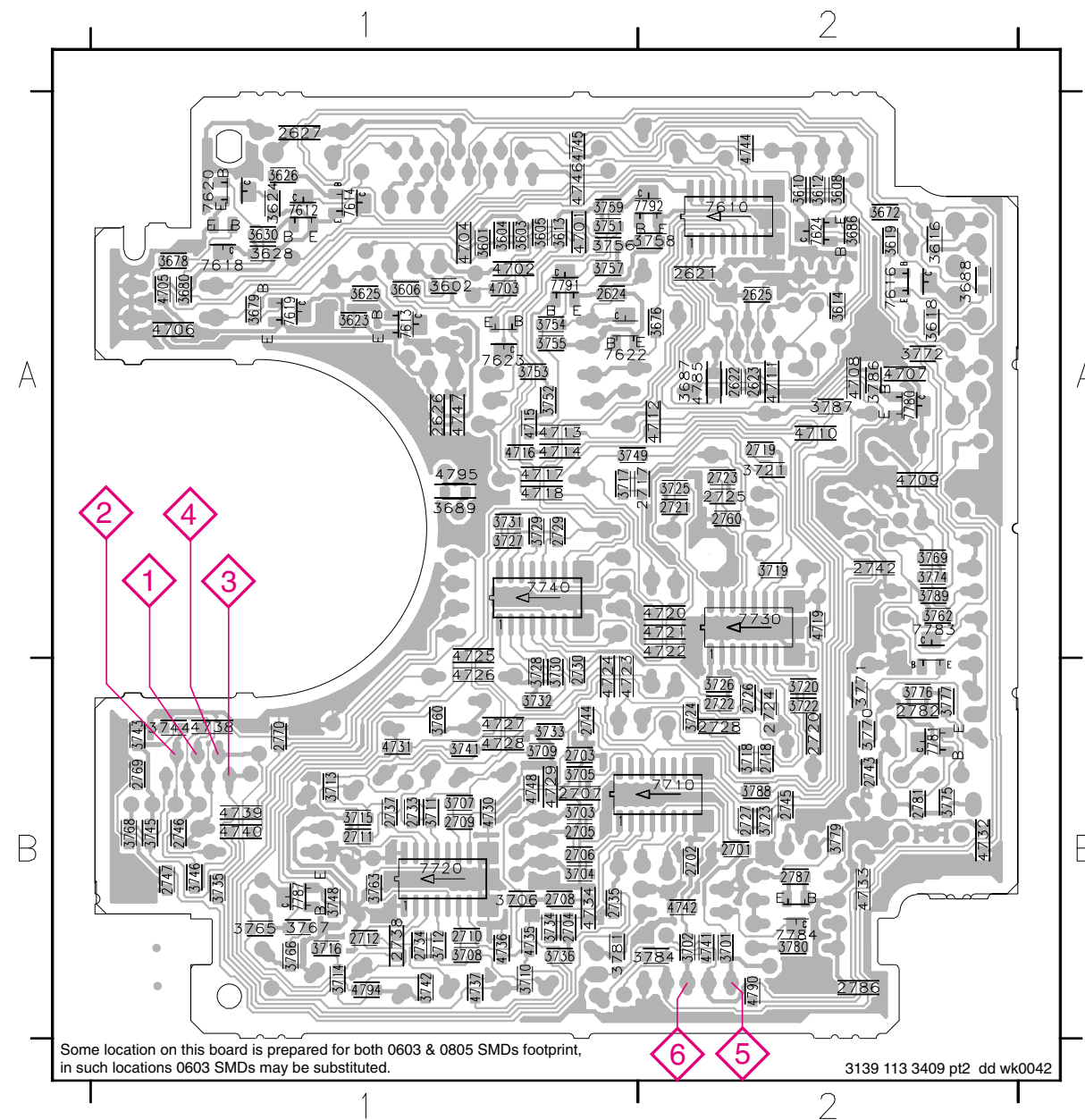
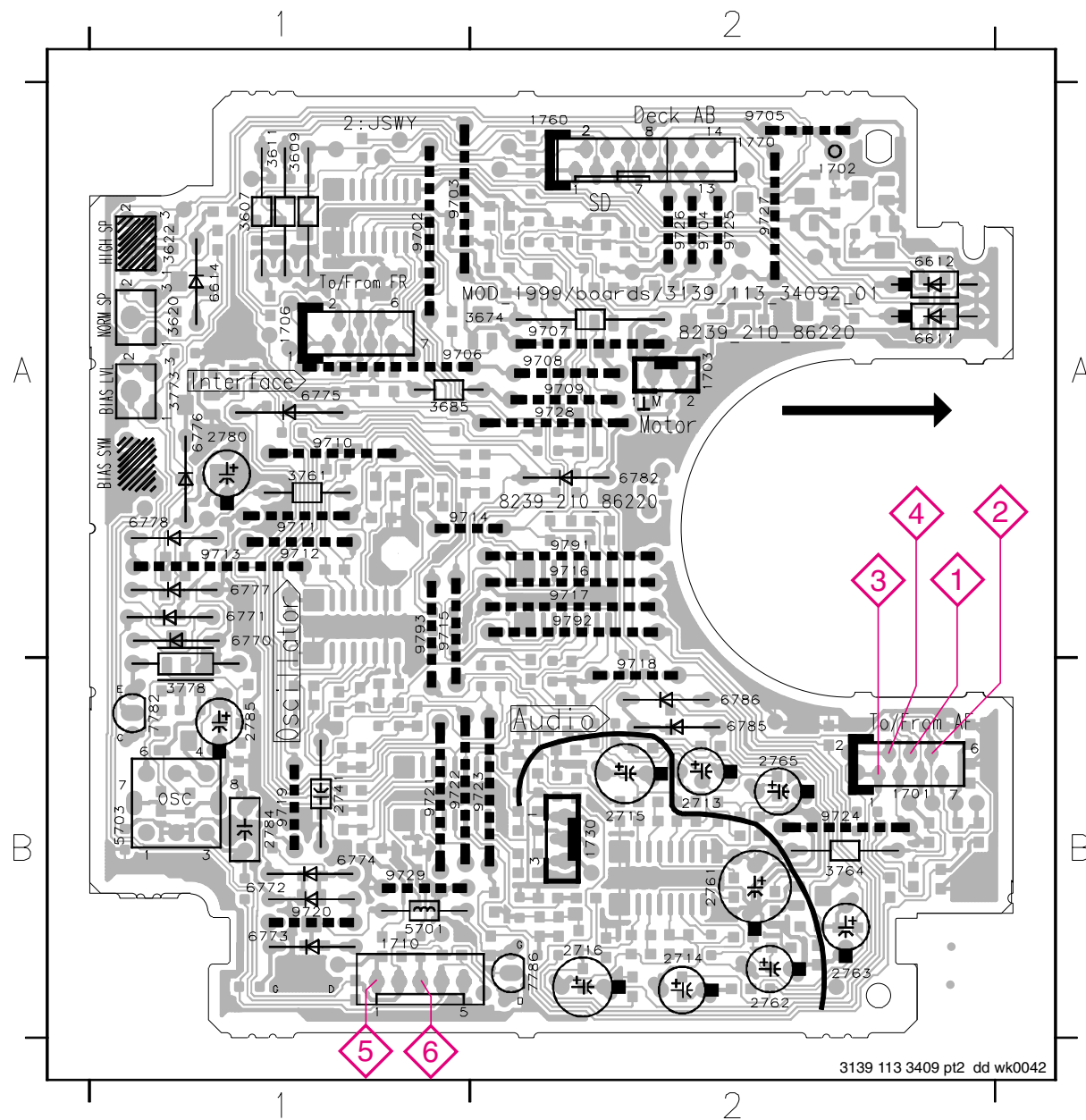


COMPONENT LAYOUT

CHIP LAYOUT

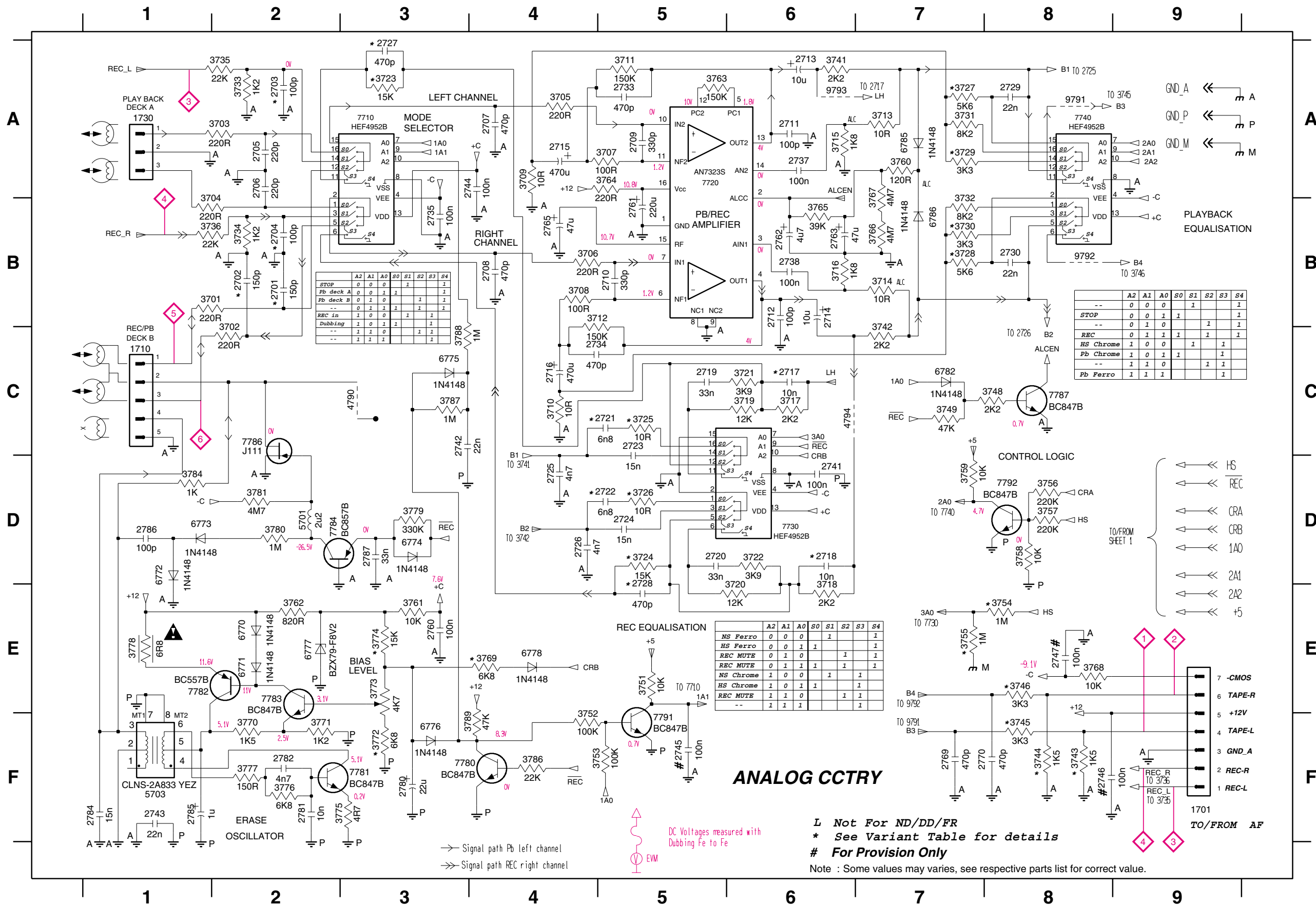
1701 B2	2714 B2	2784 B1	3761 A1	6770 A1	6782 A2	9706 A1	9715 A1	9724 B2
1702 A2	2715 B2	2785 B1	3764 B2	6771 A1	6785 B2	9707 A2	9716 A2	9725 A2
1703 A2	2716 B2	3607 A1	3773 A1	6772 B1	6786 B2	9708 A2	9717 A2	9726 A2
1706 A1	2741 B1	3609 A1	3778 B1	6773 B1	7782 B1	9709 A2	9718 B2	9727 A2
1710 B1	2761 B2	3611 A1	5701 B1	6774 B1	7786 B2	9710 A1	9719 B1	9728 A2
1730 B2	2762 B2	3620 A1	5703 B1	6775 A1	9702 A1	9711 A1	9720 B1	9729 B1
1760 A2	2763 B2	3622 A1	6611 A2	6776 A1	9703 A1	9712 A1	9721 B1	9791 A2
1770 A2	2765 B2	3674 A2	6612 A2	6777 A1	9704 A2	9713 A1	9722 B1	9792 A2
2713 B2	2780 A1	3685 A1	6614 A1	6778 A1	9705 A2	9714 A1	9723 B2	9793 A1

2621 A2	2724 B2	3602 A1	3688 A2	3725 A2	3757 A1	4701 A1	4727 B1	7612 A1
2622 A2	2725 A2	3603 A1	3689 A1	3726 B2	3758 A2	4702 A1	4728 B1	7613 A1
2623 A2	2726 B2	3604 A1	3701 B2	3727 B1	3759 A1	4703 A1	4729 B1	7614 A1
2624 A1	2727 B2	3605 A1	3702 B2	3728 B1	3760 B1	4704 A1	4730 B1	7616 A2
2625 A2	2728 B2	3606 A1	3703 B1	3729 A1	3762 A2	4705 A1	4731 B1	7618 A1
2626 A1	2729 A1	3608 A2	3704 B1	3730 B1	3763 B1	4706 A1	4732 B2	7619 A1
2627 A1	2730 B1	3610 A2	3705 B1	3731 A1	3765 B1	4707 A2	4733 B2	7620 A1
2701 B2	2733 B1	3612 A2	3706 B1	3732 B1	3766 B1	4708 A2	4734 B1	7622 A1
2702 B2	2734 B1	3613 A1	3707 B1	3733 B1	3767 B1	4709 A2	4735 B1	7623 A1
2703 B1	2735 B1	3614 A2	3708 B1	3734 A1	3768 B1	4710 A2	4736 B1	7624 A2
2704 B1	2737 B1	3616 A2	3709 B1	3735 B1	3769 A2	4711 A2	4737 B1	7710 B2
2705 B1	2738 B1	3618 A2	3710 B1	3736 B1	3770 B2	4712 A2	4738 B1	7720 B1
2706 B1	2742 A2	3619 A2	3711 B1	3737 B1	3771 B2	4713 A1	4739 B1	7730 A2
2707 B1	2743 B2	3623 A1	3712 B1	3742 B1	3772 A2	4714 A1	4740 B1	7740 A1
2708 B1	2744 B1	3624 A1	3713 B1	3743 B1	3774 A2	4715 A1	4741 B2	7780 A2
2709 B1	2745 B2	3625 A1	3714 B1	3744 B1	3775 B2	4716 A1	4742 B2	7781 B2
2710 B1	2746 B1	3626 A1	3715 B1	3745 B1	3776 B2	4717 A1	4744 A2	7783 A2
2711 B1	2747 B1	3628 A1	3716 B1	3746 B1	3777 B2	4718 A1	4745 A1	7784 B2
2712 A1	2760 A2	3630 A1	3717 A1	3748 A1	3779 B2	4719 A2	4746 A1	7787 B1
2717 A2	2769 B1	3672 A2	3718 B2	3749 A1	3780 B2	4720 A2	4747 A1	7791 A1
2718 B2	2770 B1	3676 A2	3719 A2	3751 A1	3781 B1	4721 A2	4748 B1	7792 A2
2719 A2	2781 B2	3678 A1	3720 B2	3752 A1	3784 B2	4722 A2	4785 A2	
2720 B2	2782 B2	3679 A1	3721 A2	3753 A1	3786 A2	4723 B1	4790 B2	
2721 A2	2786 B2	3680 A1	3722 B2	3754 A1	3787 A2	4724 B1	4794 B1	
2722 B2	2787 B2	3686 A2	3723 B2	3755 A1	3788 B2	4725 A1	4795 A1	
2723 A2	3601 A1	3687 A2	3724 B2	3756 A1	3789 A2	4726 B1	7610 A2	



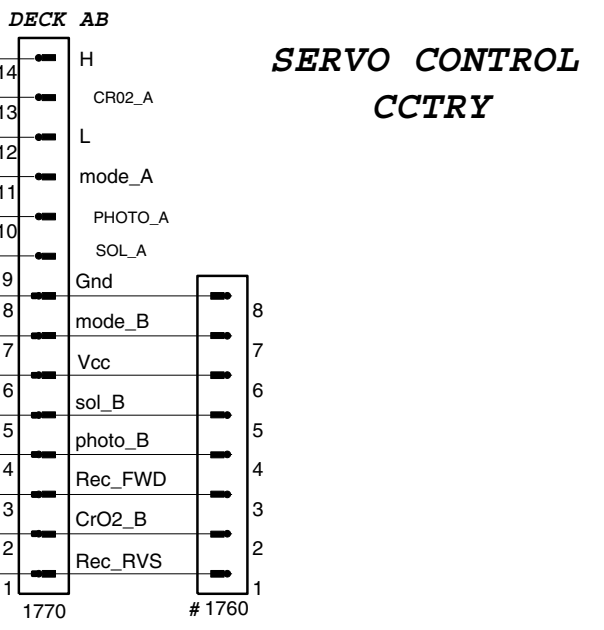
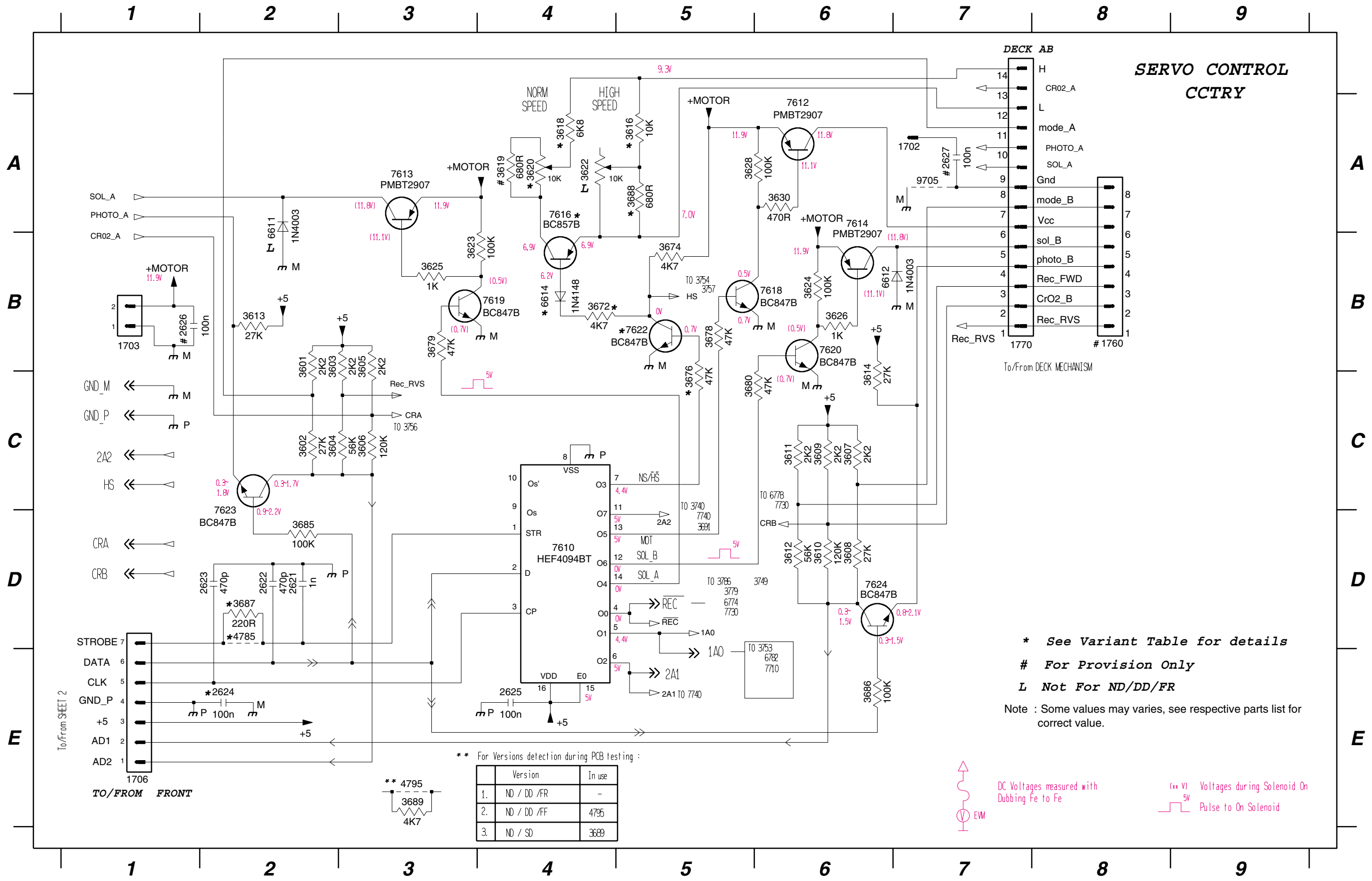
ANALOG CIRCUIT

1701 F9	2705 A2	2712 B6	2719 C5	2726 D4	2735 B3	2745 F5	2765 B4	2785 F1	3705 A4	3712 B4	3719 C6	3726 D5	3733 A2	3744 F8	3753 F5	3760 A7	3767 A7	3774 E3	3781 D2	4794 C6	6774 D3	6786 B7	7782 E1	9791 A8
1710 C1	2706 A2	2713 A6	2720 D5	2727 A3	2737 A6	2746 F8	2769 F7	2786 D1	3706 B4	3713 A7	3720 E6	3727 A7	3734 B2	3745 F8	3754 E8	3761 E3	3768 E8	3775 F3	3784 D1	5701 D2	6775 C3	6788 E2	7783 E2	9792 B8
1730 A1	2707 A4	2714 B6	2721 C5	2728 E5	2738 B6	2747 E8	2770 F8	2787 D3	3707 A5	3714 B7	3721 C6	3728 B7	3735 A2	3746 E8	3755 E7	3762 E2	3769 E4	3776 F2	3786 F4	5703 F1	6776 F3	6789 F4	7784 D2	9793 A6
2701 B2	2708 B4	2715 A4	2722 D5	2729 A8	2741 D6	2760 E3	2780 F3	3701 B1	3708 B4	3715 A6	3722 D6	3729 A7	3736 B1	3748 C8	3756 D8	3763 A5	3770 F2	3777 F2	3787 C3	6770 E2	6777 E2	7730 D6	7786 C2	
2702 B2	2709 A5	2716 C4	2723 C5	2730 B8	2742 C3	2761 B5	2781 F2	3702 C2	3709 A4	3716 B6	3723 A3	3730 B7	3741 A6	3749 C7	3757 D8	3764 A5	3771 F2	3778 E1	3788 C3	6771 E2	6778 E4	7740 A8	7787 C8	
2703 A2	2710 B5	2717 C6	2724 D5	2733 A5	2743 F1	2762 B6	2782 F2	3703 A2	3710 C4	3717 C6	3724 D5	3731 A7	3742 C7	3751 E5	3758 D8	3765 B6	3772 F3	3779 D3	3789 F4	6772 D1	6782 C7	7780 F4	7791 F5	
2704 B2	2711 A6	2718 D6	2725 D4	2734 C4	2744 A4	2763 B6	2784 F1	3704 B1	3711 A5	3718 E6	3725 C5	3732 B7	3743 F8	3752 F4	3759 D7	3766 B7	3773 E3	3780 D2	4790 C3	6773 D1	6785 A7	7781 F3	7792 D8	



SERVO CONTROL CIRCUIT

- 1702 A7 1760 B8 2622 D2 2625 E4 3601 B2 3604 C2 3607 C6 3610 D6 3613 B2 3618 A4 3622 A4 3625 B3 3630 A6 3676 C5 3680 C5 3687 D2 4785 D2 6612 B6 7612 A6 7616 A4 7620 B6 7624 D6
 1703 B1 1770 B7 2623 D2 2626 B1 3602 C2 3605 B3 3608 D6 3611 C6 3614 C6 3619 A4 3623 B3 3626 B6 3672 B4 3678 B5 3685 D2 3688 A5 4795 E3 6614 B4 7613 A3 7618 B6 7622 B5 9705 A7
 1706 E1 2621 D2 2624 E2 2627 A7 3603 B2 3606 C3 3609 C6 3612 D6 3616 A5 3620 A4 3624 B6 3628 A5 3674 B5 3679 B3 3686 E6 3689 E3 6611 A2 7610 D4 7614 A6 7619 B4 7623 D2

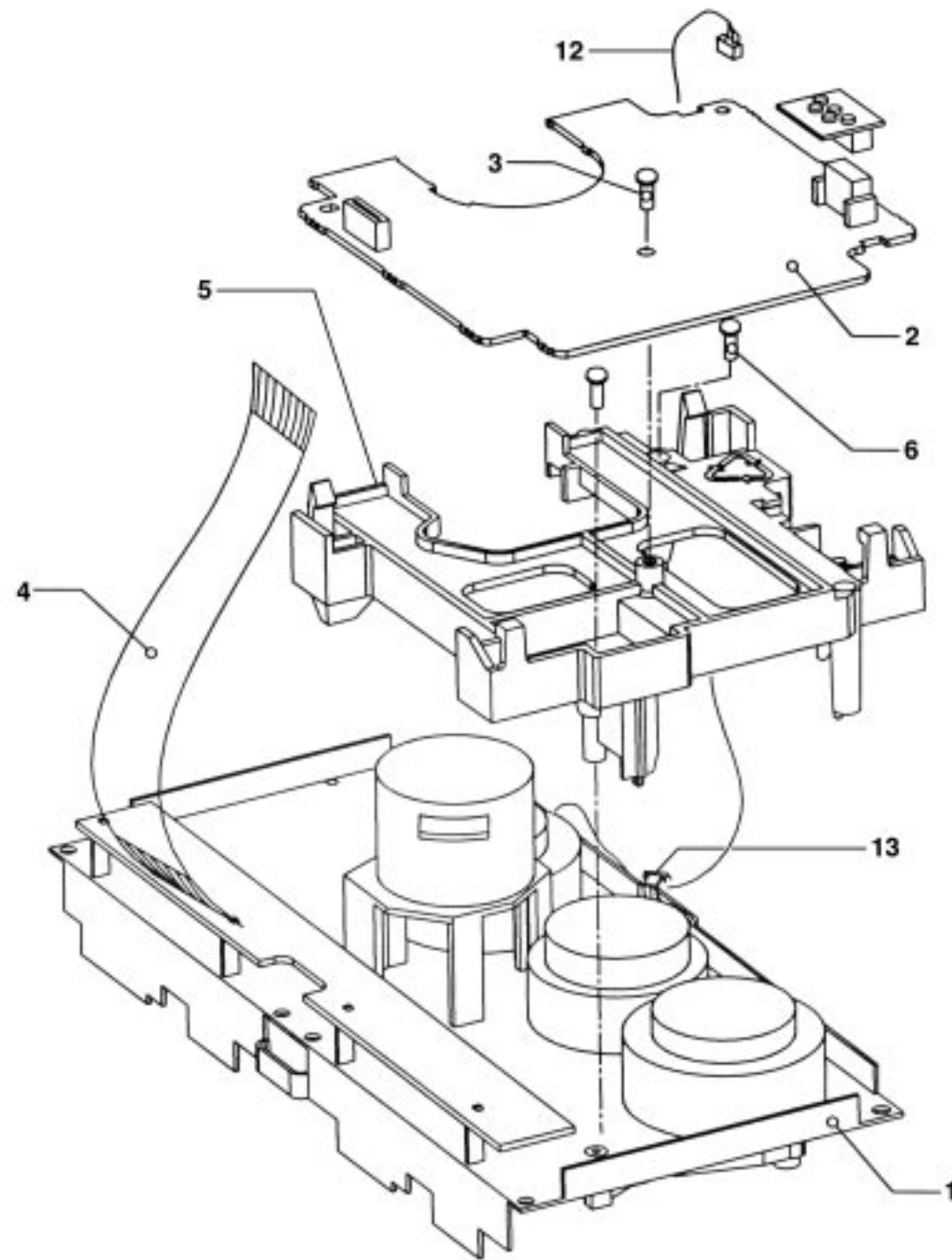


* See Variant Table for details
 # For Provision Only
 L Not For ND/DD/FR
 Note : Some values may varies, see respective parts list for correct value.

** For Versions detection during PCB testing :

Version	In use
1. ND / DD /FR	-
2. ND / DD /FF	4795
3. ND / SD	3689



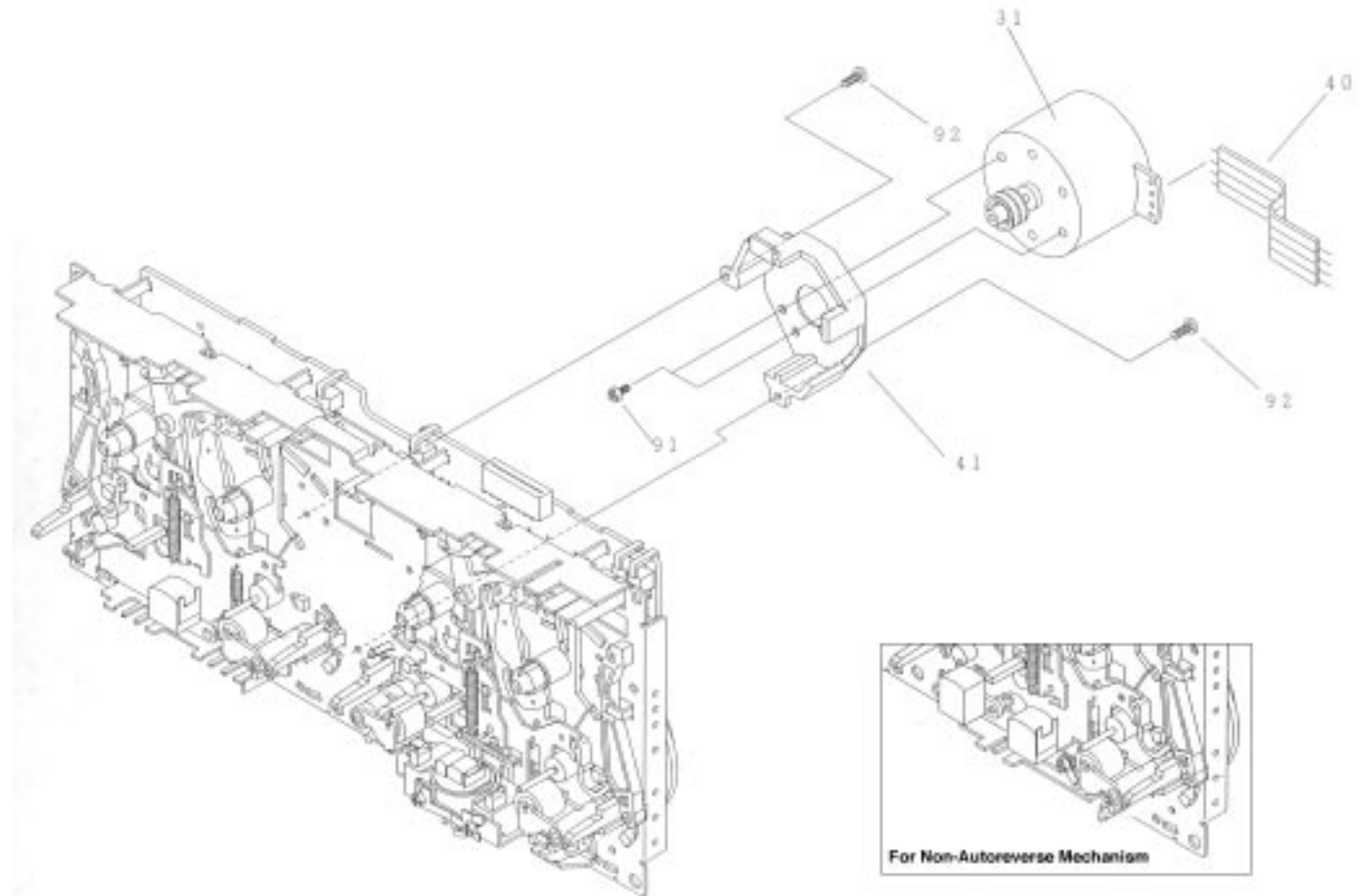


3139 118 77070 (incl. ...77080) dd wr226

TAPE MODULE EXPLODED VIEW

1	3139 118 77130	Autoreverse Mech. CWE44FR01
1	3139 118 77140	Non-Autoreverse Mech. CWE44FF02 Chrome/Ferro
1	3139 118 77950	Non-Autoreverse Mech. CWE44FF05 Ferro
3	-	Screw D3 x 10
6	-	Screw M2 x 16
7	3139 110 34080	Flex Cable 14 pin 7,5 cm

Note: Only the parts mentioned in this list are normal service spare parts.

**TAPE MECHANISM - MOTOR EXPLODED VIEW**

31	4822 361 11055	Motor Assembly
91	-	Screw M2,6 x 5
92	-	Screw M2 x 5

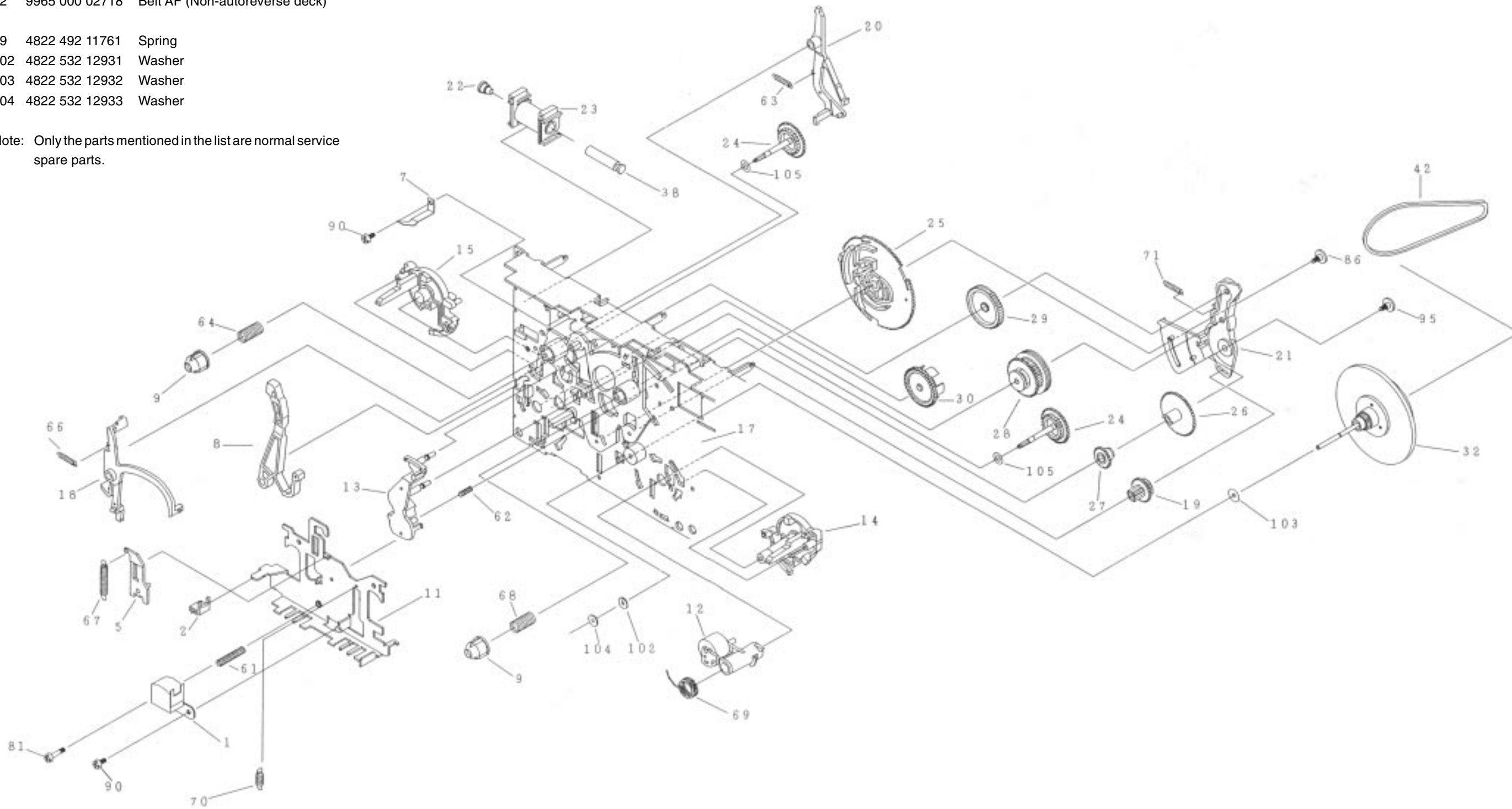
Note: Only the parts mentioned in this list are normal service spare parts.

TAPE MECHANISM A - PLAY

MECHANICAL PARTS - PLAY MECHANISM

1	9965 000 02313	Play Head (Non-Autoreverse deck)
1	9965 000 02321	Play Head (Autoreverse deck)
12	4822 402 10972	Pinch Arm Assembly R
23	9965 000 02314	Coil Assembly
25	9965 000 06443	Cam Gear
32	4822 528 11209	Flywheel Assembly RV
42	9965 000 02315	Belt AF (Autoreverse deck)
42	9965 000 02718	Belt AF (Non-autoreverse deck)
69	4822 492 11761	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

Note: Only the parts mentioned in the list are normal service spare parts.

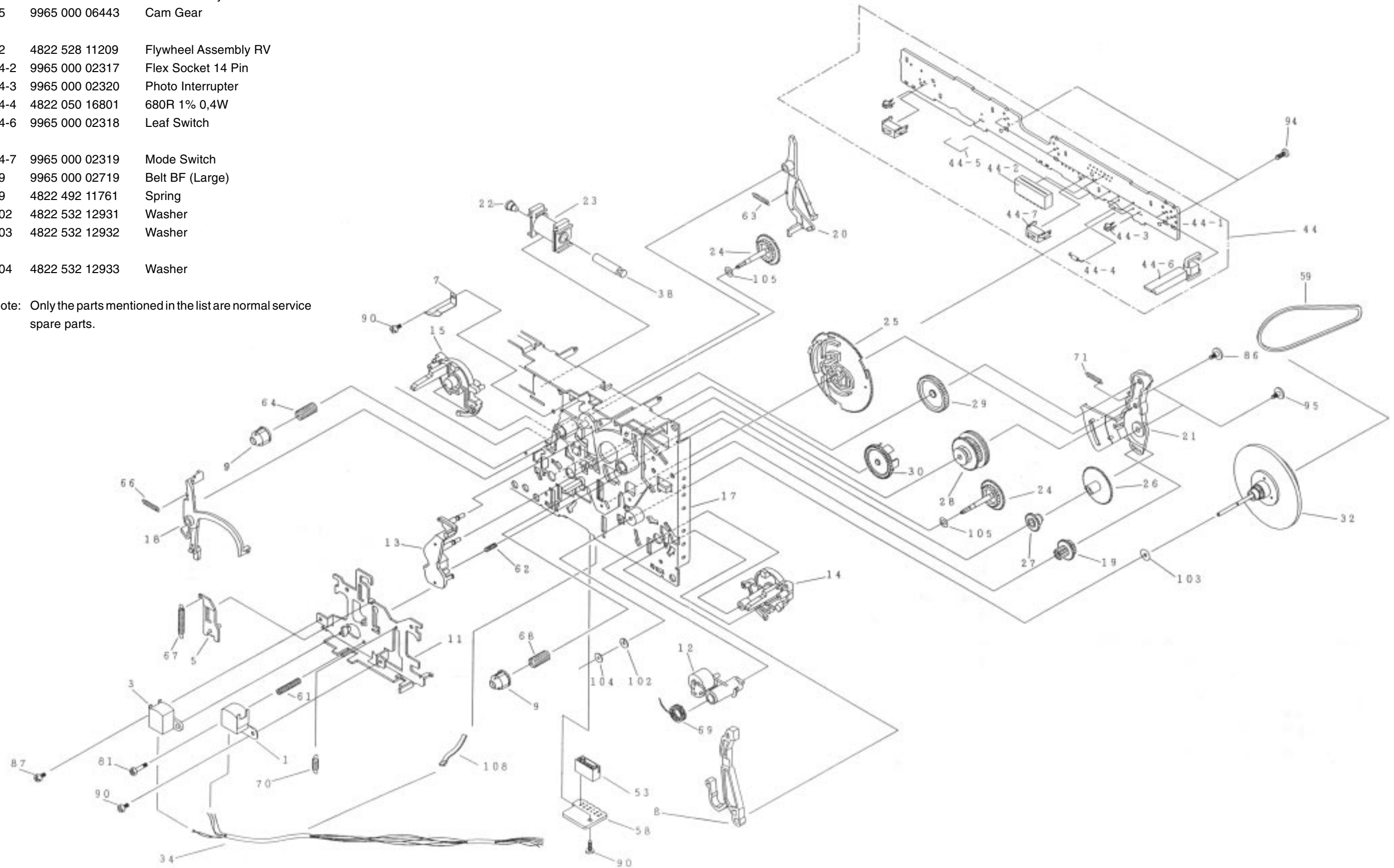


TAPE MECHANISM B - RECORD/PLAYBACK (Non-Autoreverse version)

MECHANICAL PARTS - REC/PB MECHANISM

1	9965 000 02313	Play Head
3	9965 000 02600	Head, Erase
12	4822 402 10972	Pinch Arm Assembly R
23	9965 000 02314	Coil Assembly
25	9965 000 06443	Cam Gear
32	4822 528 11209	Flywheel Assembly RV
44-2	9965 000 02317	Flex Socket 14 Pin
44-3	9965 000 02320	Photo Interrupter
44-4	4822 050 16801	680R 1% 0,4W
44-6	9965 000 02318	Leaf Switch
44-7	9965 000 02319	Mode Switch
59	9965 000 02719	Belt BF (Large)
69	4822 492 11761	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

Note: Only the parts mentioned in the list are normal service spare parts.



TAPE MECHANISM B - RECORD/PLAYBACK (Autoreverse version)

MECHANICAL PARTS - REC/PB MECHANISM

12	4822 402 10972	Pinch Arm Assembly R
23	9965 000 02314	Coil Assembly
25	9965 000 06443	Cam Gear
32	4822 528 11209	Flywheel Assembly RV
39	9965 000 02322	Belt AF

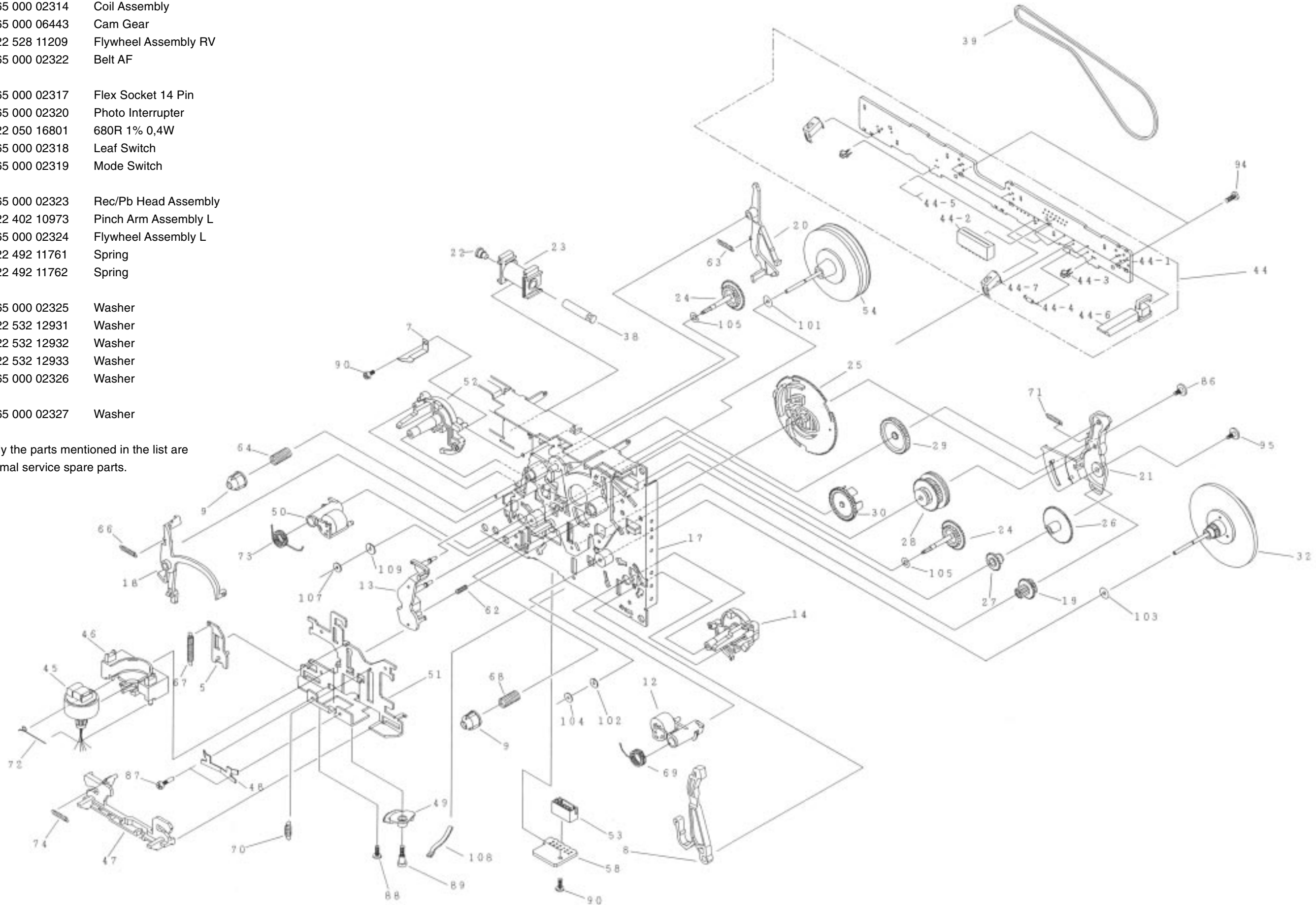
44-2	9965 000 02317	Flex Socket 14 Pin
44-3	9965 000 02320	Photo Interrupter
44-4	4822 050 16801	680R 1% 0,4W
44-6	9965 000 02318	Leaf Switch
44-7	9965 000 02319	Mode Switch

45	9965 000 02323	Rec/Pb Head Assembly
50	4822 402 10973	Pinch Arm Assembly L
54	9965 000 02324	Flywheel Assembly L
69	4822 492 11761	Spring
73	4822 492 11762	Spring

101	9965 000 02325	Washer
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer
107	9965 000 02326	Washer

109	9965 000 02327	Washer
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Note: Only the parts mentioned in the list are normal service spare parts.



ELECTRICAL PARTS LIST - ETF7 NON-DOLBY BOARD

MISCELLANEOUS

1701	482226710953	Flex Socket 7pin Vert.
1706	482226710953	Flex Socket 7pin Vert.
1770	482226751255	Flex Socket 14pin Vert.

CAPACITORS

2621	532212231647	1nF 10% 63V
2622	532212234099	470pF 10% 63V
2623	532212234099	470pF 10% 63V
2624	482212614585	100nF 10% 50V only for Ferro
2625	482212614585	100nF 10% 50V
2701	532212233538	150pF 2% 63V Autoreverse
2701	482212233216	270pF 5% 63V Non-autoreverse
2702	532212233538	150pF 2% 63V Autoreverse
2702	482212233216	270pF 5% 63V Non-autoreverse
2703	532212232531	100pF 5% 50V Autoreverse
2703	482212233575	220pF 5% 63V Non-autoreverse
2704	532212232531	100pF 5% 50V Autoreverse
2704	482212233575	220pF 5% 63V Non-autoreverse
2705	482212233575	220pF 5% 63V
2706	482212233575	220pF 5% 63V
2707	532212234099	470pF 10% 63V
2708	532212234099	470pF 10% 63V
2709	532212231863	330pF 5% 63V
2710	532212231863	330pF 5% 63V
2711	532212232531	100pF 5% 50V
2712	532212232531	100pF 5% 50V
2713	482212440248	10μF 20% 63V
2714	482212440248	10μF 20% 63V
2715	482212480195	470μF 20% 10V
2716	482212480195	470μF 20% 10V
2717	482212233177	10nF 20% 50V Autoreverse
2717	482212613188	15nF 5% 63V Non-autoreverse
2718	482212233177	10nF 20% 50V Autoreverse
2718	482212613188	15nF 5% 63V Non-autoreverse
2719	482212612105	33nF 5% 50V
2720	482212612105	33nF 5% 50V
2721	532212231866	6,8nF 10% 63V not for Ferro
2722	532212231866	6,8nF 10% 63V not for Ferro
2723	482212613188	15nF 5% 63V
2724	482212613188	15nF 5% 63V
2725	532212610223	4,7nF 10% 63V
2726	532212610223	4,7nF 10% 63V
2727	532212234099	470pF 10% 63V Autoreverse
2727	532212231647	1nF 10% 63V Non-autoreverse
2728	532212234099	470pF 10% 63V Autoreverse
2728	532212231647	1nF 10% 63V Non-autoreverse
2729	532212232654	22nF 10% 63V
2730	532212232654	22nF 10% 63V
2733	532212234099	470pF 10% 63V
2734	532212234099	470pF 10% 63V
2735	482212614585	100nF 10% 50V
2737	482212614585	100nF 10% 50V

2738	482212614585	100nF 10% 50V
2741	482212611585	22nF +80/-20% 25V
2742	532212232654	22nF 10% 63V
2743	532212232654	22nF 10% 63V
2744	482212614585	100nF 10% 50V
2760	482212614585	100nF 10% 50V
2761	482212480144	220μF 20% 25V
2762	482212440769	4,7μF 20% 100V
2763	482212440433	47μF 20% 25V
2765	482212440433	47μF 20% 25V
2769	532212234099	470pF 10% 63V
2770	532212234099	470pF 10% 63V
2780	482212481151	22μF 20% 50V
2781	482212233177	10nF 20% 50V
2782	532212610223	4,7nF 10% 63V
2784	482212151305	15nF 10% 50V
2785	482212421913	1μF 20% 63V
2786	532212232531	100pF 5% 50V
2787	482212612105	33nF 5% 50V

RESISTORS

3601	482211711449	2k2 1% 0,1W
3602	482205120273	27k 5% 0,1W
3603	482211711449	2k2 1% 0,1W
3604	482211711148	56k 1% 0,1W
3605	482211711449	2k2 1% 0,1W
3606	482205120124	120k 5% 0,1W
3607	482211652256	2k2 5% 0,5W
3608	482205120273	27k 5% 0,1W
3609	482211652256	2k2 5% 0,5W
3610	482205120124	120k 5% 0,1W
3611	482211652256	2k2 5% 0,5W
3612	482211711148	56k 1% 0,1W
3613	482205120273	27k 5% 0,1W
3614	482205120273	27k 5% 0,1W
3616	482211710833	10k 1% 0,1W Autoreverse
3616	482205110102	1k 2% 0,25W Non-autoreverse
3618	482211711507	6k8 1% 0,1W Autoreverse
3620	482210011141	Trim. 10k 30% Autoreverse
3622	482210011141	Trim. 10k 30% Non-autoreverse
3623	482211710837	100k 1% 0,1W
3624	482211710837	100k 1% 0,1W
3625	482205110102	1k 2% 0,25W
3626	482205110102	1k 2% 0,25W
3628	482211710837	100k 1% 0,1W
3630	482205120471	470R 5% 0,1W
3672	482205120472	4k7 5% 0,1W Autoreverse
3674	482211652283	4k7 5% 0,5W
3676	482211710834	47k 1% 0,1W Autoreverse
3678	482211710834	47k 1% 0,1W
3679	482211710834	47k 1% 0,1W
3680	482211710834	47k 1% 0,1W

ELECTRICAL PARTS LIST - ETF7 NON-DOLBY BOARD

3685	482211652234	100k 5% 0,5W		3745	482205120332	3k3 5% 0,1W	Autoreverse
3686	482211710837	100k 1% 0,1W		3745	482205120562	5k6 5% 0,1W	Non-autoreverse
3687	482211711503	220R 1% 0,1W	not for Ferro	3746	482205120332	3k3 5% 0,1W	Autoreverse
3688	482211710361	680R 1% 0,1W	Autoreverse	3746	482205120562	5k6 5% 0,1W	Non-autoreverse
3701	482211711503	220R 1% 0,1W		3748	482211711449	2k2 1% 0,1W	
3702	482211711503	220R 1% 0,1W		3749	482211710834	47k 1% 0,1W	
3703	482211711503	220R 1% 0,1W		3751	482211710833	10k 1% 0,1W	
3704	482211711503	220R 1% 0,1W		3752	482211710837	100k 1% 0,1W	
3705	482211711503	220R 1% 0,1W		3753	482211710837	100k 1% 0,1W	
3706	482211711503	220R 1% 0,1W		3754	482205120105	1M 5% 0,1W	Autoreverse
3707	482205120101	100R 5% 0,1W		3754	482205120479	47R 5% 0,1W	Non-autoreverse
3708	482205120101	100R 5% 0,1W		3755	482205120105	1M 5% 0,1W	Autoreverse
3709	482205120109	10R 5% 0,1W		3755	482205120479	47R 5% 0,1W	Non-autoreverse
3710	482205120109	10R 5% 0,1W		3756	482211713579	220k 1% 0,1W	
3711	482205120154	150k 5% 0,1W		3757	482211713579	220k 1% 0,1W	
3712	482205120154	150k 5% 0,1W		3758	482211710833	10k 1% 0,1W	
3713	482205120109	10R 5% 0,1W		3759	482211710833	10k 1% 0,1W	
3714	482205120109	10R 5% 0,1W		3760	482205120121	120R 5% 0,1W	
3715	482205120182	1k8 5% 0,1W		3761	482205021003	10k 1% 0,6W	
3716	482205120182	1k8 5% 0,1W		3762	482211711454	820R 1% 0,1W	
3717	482211711449	2k2 1% 0,1W		3763	482205120154	150k 5% 0,1W	
3718	482211711449	2k2 1% 0,1W		3764	482211683872	220R 5% 0,5W	
3719	482211711383	12k 1% 0,1W		3765	482205120393	39k 5% 0,1W	
3720	482211711383	12k 1% 0,1W		3766	482205120475	4M7 5% 0,1W	
3721	482205120392	3k9 5% 0,1W		3767	482205120475	4M7 5% 0,1W	
3722	482205120392	3k9 5% 0,1W		3768	482211710833	10k 1% 0,1W	
3723	482211683933	15k 1% 0,1W	Autoreverse	3769	482211711383	12k 1% 0,1W	Autoreverse
3723	482211710965	18k 1% 0,1W	Non-autoreverse	3769	482205120822	8k2 5% 0,1W	Non-autoreverse
3724	482211683933	15k 1% 0,1W	Autoreverse	3770	482211711139	1k5 1% 0,1W	
3724	482211710965	18k 1% 0,1W	Non-autoreverse	3771	482205120122	1k2 5% 0,1W	
3725	482205120109	10R 5% 0,1W	not for Ferro	3772	482211711507	6k8 1% 0,1W	Autoreverse
3726	482205120109	10R 5% 0,1W	not for Ferro	3772	482205120562	5k6 5% 0,1W	Non-autoreverse
3727	482205120562	5k6 5% 0,1W	Autoreverse	3773	482210012227	Trimmer 4k7 30% 0,1W	
3727	482211711507	6k8 1% 0,1W	Non-autoreverse	3774	482211683933	15k 1% 0,1W	Autoreverse
3728	482205120562	5k6 5% 0,1W	Autoreverse	3774	482205120822	8k2 5% 0,1W	Non-autoreverse
3728	482211711507	6k8 1% 0,1W	Non-autoreverse	3775	482205120478	4R7 5% 0,1W	
3729	482205120332	3k3 5% 0,1W	Autoreverse	3776	482211711507	6k8 1% 0,1W	
3729	482205120472	4k7 5% 0,1W	Non-autoreverse	3777	482211710353	150R 1% 0,1W	
3730	482205120332	3k3 5% 0,1W	Autoreverse	3778	482205210688	△ 6R8 5% 0,33W	
3730	482205120472	4k7 5% 0,1W	Non-autoreverse	3779	482205120334	330k 5% 0,1W	
3731	482205120822	8k2 5% 0,1W		3780	482205120105	1M 5% 0,1W	
3732	482205120822	8k2 5% 0,1W		3781	482205120475	4M7 5% 0,1W	
3733	482205120122	1k2 5% 0,1W		3784	482205110102	1k 2% 0,25W	
3734	482205120122	1k2 5% 0,1W		3786	482205120223	22k 5% 0,1W	
3735	482205120223	22k 5% 0,1W		3787	482205120105	1M 5% 0,1W	
3736	482205120223	22k 5% 0,1W		3788	482205120105	1M 5% 0,1W	
3741	482211711449	2k2 1% 0,1W		3789	482211710834	47k 1% 0,1W	
3742	482211711449	2k2 1% 0,1W		4701	482205120008	0R Jumper 0805	
3743	482211711139	1k5 1% 0,1W	Autoreverse	4702	482205120008	0R Jumper 0805	
3743	482211711449	2k2 1% 0,1W	Non-autoreverse	4703	482205120008	0R Jumper 0805	
3744	482211711139	1k5 1% 0,1W	Autoreverse	4704	482205120008	0R Jumper 0805	
3744	482211711449	2k2 1% 0,1W	Non-autoreverse	4705	482205120008	0R Jumper 0805	

ELECTRICAL PARTS LIST - ETF7 NON-DOLBY BOARD**RESISTORS**

4706	482205120008	0R Jumper 0805	6612	482213031878	1N4003G	
4707	482205120008	0R Jumper 0805	6614	482213030621	1N4148	Autoreverse
4708	482205120008	0R Jumper 0805	6770	482213030621	1N4148	
4709	482205120008	0R Jumper 0805	6771	482213030621	1N4148	
4710	482205120008	0R Jumper 0805	6772	482213030621	1N4148	
4711	482205120008	0R Jumper 0805	6773	482213030621	1N4148	
4712	482205120008	0R Jumper 0805	6774	482213030621	1N4148	
4713	482205120008	0R Jumper 0805	6775	482213030621	1N4148	
4714	482205120008	0R Jumper 0805	6776	482213030621	1N4148	
4715	482205120008	0R Jumper 0805	6777	482213034382	BZX79-F8V2	
4716	482205120008	0R Jumper 0805	6778	482213030621	1N4148	
4717	482205120008	0R Jumper 0805	6782	482213030621	1N4148	
4718	482205120008	0R Jumper 0805	6785	482213030621	1N4148	
4719	482205120008	0R Jumper 0805	6786	482213030621	1N4148	
4720	482205120008	0R Jumper 0805				
4721	482205120008	0R Jumper 0805				
4722	482205120008	0R Jumper 0805				
4723	482205120008	0R Jumper 0805				
4724	482205120008	0R Jumper 0805				
4725	482205120008	0R Jumper 0805				
4726	482205120008	0R Jumper 0805				
4727	482205120008	0R Jumper 0805				
4728	482205120008	0R Jumper 0805				
4729	482205120008	0R Jumper 0805				
4730	482205120008	0R Jumper 0805				
4731	482205120008	0R Jumper 0805				
4732	482205120008	0R Jumper 0805				
4733	482205120008	0R Jumper 0805				
4734	482205120008	0R Jumper 0805				
4735	482205120008	0R Jumper 0805				
4736	482205120008	0R Jumper 0805				
4737	482205120008	0R Jumper 0805				
4738	482205120008	0R Jumper 0805				
4739	482205120008	0R Jumper 0805				
4740	482205120008	0R Jumper 0805				
4741	482205120008	0R Jumper 0805				
4742	482205120008	0R Jumper 0805				
4744	482205120008	0R Jumper 0805				
4745	482205120008	0R Jumper 0805				
4746	482205120008	0R Jumper 0805				
4748	482205120008	0R Jumper 0805				
4785	482205120008	0R Jumper 0805 only for Ferro				
4790	482205120008	0R Jumper 0805				
4794	482205120008	0R Jumper 0805				
4795	482205120008	0R Jumper 0805				

TRANSISTORS & INTEGRATED CIRCUITS

7610	532220911306	HEF4094BT				
7612	482213011201	PMBT2907				
7613	482213011201	PMBT2907				
7614	482213011201	PMBT2907				
7616	482213060373	BC857B				Autoreverse
7618	482213060511	BC847B				
7619	482213060511	BC847B				
7620	482213060511	BC847B				
7622	482213060511	BC847B				Autoreverse
7623	482213060511	BC847B				
7624	482213060511	BC847B				
7710	482220932919	HEF4952BT				
7720	932214000668	AN7323S				
7730	482220932919	HEF4952BT				
7740	482220932919	HEF4952BT				
7780	482213060511	BC847B				
7781	482213042804	BC817-25				
7782	482213044568	BC557B				
7783	482213060511	BC847B				
7784	482213060373	BC857B				
7786	482213063494	J111				
7787	482213060511	BC847B				
7791	482213060511	BC847B				
7792	482213060511	BC847B				

Note: Only the parts mentioned in this list are normal service spare parts.

COILS & FILTERS

5701	482215711477	Coil 2,2μH 5%
5703	482215620946	Osc Coil 100kHz

DIODES

6611	482213031878	1N4003G
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