

ARCAM

ALPHA 5 CD PLAYER SERVICE MANUAL

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CIRCUIT DESCRIPTION

Audio Board

The audio board contains the digital filter, DAC, audio output stages and associated power supplies.

The required signals from the main board are passed to the audio board via the 18 way connector. This connector carries DAAB, CLAB, WSAB, DEEM, 0V, ATSB XSYS, EFAB and +5V line.

The DAC requires 3 supply rails to function, +5V, -5V and -15V and also a series of averaging capacitors, (C1-7,C101-107), for the bit switches in each channel of the DAC for good linearity and low distortion. The +5V supply is filtered by RC network R216, C219, C220 and the -15V supply L201 and C224, C225. The output of the DAC is fed to Z1 to convert the output current to a voltage and provide gain. The second ic, Z2, with its associated components forms a low pass 2 pole filter, which combined with the first stage forms a 3 pole Bessel filter.

Transistor Q1 is used to switch in additional components if the de-emphasis flag DEEM goes high. This is done automatically when a disc recorded with pre-emphasis is played.

The digital output (DOBM) is derived from pin 14 of the digital filter (Z206) and is formed by isolating transformer T201 and associated circuitry.

The "Kill" line to mute the audio outputs, with transistors Q2, 102, comes in on the 4th pin of socket SK202 which also carries the dc supplies for the audio board.

The audio board is supplied with smoothed +/- 25v D.C via a 4 way connector, SK202. R201,C205 and R202,C206 provides additional filtering before the regulators. There are 4 regulators, +/-15V and +/- 5V formed by adjustable regulators Z201,202 and Z203,204 respectively.

Mono Board

Photo diode signal & Radial Error Processors

The TDA8808(Z501) and TDA8809(Z502) ic's are the signal processors for the laser unit. The TDA8808 amplifies the photo-diode signals from the CDM-9 mechanism and processes the error signals for the focus and radial control network. The TDA8809 provides control signals for the radial motor. These signals are generated from radial error signals received from the TDA8808 and velocity control signals from the control processor. Z503,(TCA0372) is a high power op-amp to drive the radial arm. Z604 is used to drive the turntable motor with the use of the transistor output stage formed by Q604 and Q605.

Unlike earlier mechanisms the CDM-9 mechanism is aligned during manufacture and is not adjustable.

Microcontroller & Decoder

The appropriate signals are passed to and from these ic's to the servo microprocessor, 68HC05C8, (Z603) and the decoder (Z601) ic. The output from the decoder chip goes via an 18 way connector to the audio board.

The meaning of the used signals on the servo microprocessor is as follows:

- Si/RD: On/off control for the focus servo system. This line is continuously made low by the SERVO-uP during the stop condition. At starting up, the SERVO-uP forces this line in a high-Z state. In this case the focus servo system is enabled. After some time the Si/RD-signal is made low for a short period to indicate that the focus servo is ready.
- TL: Track loss. This signal is made low by the TDA8808 as soon as a track is lost.
- REdig: Digital radial error signal (Re2 - RE1).
- BO:
B1: Input control bits for off-, catch-, play-status and
B2: DAC-output-current for radial motor.
B3:
- RE: $\frac{1}{2}$ bit DAC. This signal is normally held high-Z by the SERVO-uP. However when TL goes low the RE line can influence the proportional amplification of the radial servo (improved S-curve).
- CRI: Counter reset inhibit. This signal goes low during a real track loss ($>600\mu s$) or during execution of a jump command. When low, this signal allows the divide-by-588 master counter in the DEMOD timing of the SAA7310 to run free. The signal becomes high during initialization of the "catch" status of the radial servo.
- DODS: Drop-out detector suppression. This signal is externally hard wired with the CRI-signal.
- QRA:
QDA: Subcode channel.
QCL:
- SWAB/SSM: Subcoding word clock and start/stop turntable motor. This line is continuously made low by the SERVO-uP during the stop condition. At starting up the SERVO-uP forces this line to the high-Z state. In this case the turntable motor is started and the subcoding word clock is connected to this line by the SAA7310. If this line is forced low by the SERVO-uP, a motor stop condition will be decoded by the SAA7310 and fed to the turntable motor control logic circuit.
- MC: Motor speed control. The SERVO-uP uses this line to measure the turntable motor starting up time. This is necessary for the 8cm/12cm disk identification and for the software controlled brake of the turntable motor.
- TEMP: Motor offset and bandwidth switch. At starting up the turntable motor, the SERVO-uP measures the starting up time (cfr. MCES). If this time is small (small moment of inertia), the TTMO line is turned high by the SERVO-uP. If this time is long (high moment of inertia), the TTMO line remains low. As the TTMO line is switched high the DC amplification is lowered and an offset is injected to the turntable motor circuit.

Power Supply

The mains input to the unit may be 230V or 115V, selectable by insertion of the appropriate fuse.

This unit does not have a mains on-off power switch. Instead there is a 'Standby' switch (SW402) which turns off the power to some parts of the circuit (decoder, digital filter and display) and puts the main microcontroller into a reset condition.

Two separate windings on the secondary provide isolated digital and analogue power supplies.

The digital supplies consist of +10V & -10V unregulated to power the servo drivers and motors and +5V (Z402) and -5V (Z403) for the critical signal processing and microcontrollers. Two other taps on the same winding are regulated by Z401, providing the -20V rail required by the fluorescent display.

There is an additional winding that powers the filament on the display via pass transistor Q403. Pressing the front panel 'Display' button toggles flip-flop Z405, switching Q403 (and therefore the display) on and off.

The supply to the audio board is +25V, -25V with an analogue ground.

DISASSEMBLY FOR SERVICING

ANTI STATIC PRECAUTIONS MUST BE OBSERVED

1. Remove the cover by removing the 4 side screws and 4 rear screws. Slide the cover backwards and up.
2. Remove the 4 side screws holding the front panel on and one screw from the centre of the front panel accessed from inside the unit. The front should now pull off.
3. Remove the 2 screws from the digital and audio output sockets on the audio board. Squeeze the pcb pillar in the centre of the audio board and pull the board up. It will be tight because of the connectors between the audio and monobards.

NOTE: Because the master clock is on the audio board the unit will not function with the audio board removed from the player.

4. Push the tray of the CD player forward to reveal a mounting screw at the rear of the mechanism chassis. Remove this screw.
5. Remove 4 screws situated on the mono board close to the corners of the transformer.
6. Remove the 2 screws connecting the rear panel to the mains inlet socket and squeeze the top of the 2 pcb pillars.

The monoboard, complete with mechanism, sub front and display board should now be free and can be pulled up and out of the chassis.

The display board can be removed, if necessary, by removing the 2 screws on the front and squeezing the pcb pillars. The board can then be pulled off its 2 connectors.

The mechanism can be removed by removing 2 screws from the sub front and 2 screws from the underside of the monoboard. Unclip the 3 connectors from the mechanism to monoboard.

Lift the mechanism up carefully and release the flexible pcb from the mechanism to monoboard. The mechanism can now be removed fully.

NOTE:- You must fit a paper clip across the end of the flexible pcb to prevent static damage to the laser whilst it is out of the case.

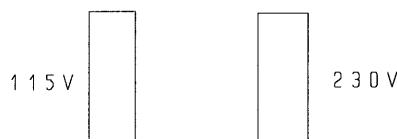
CHANGE OF MAINS VOLTAGE

WARNING - the unit **must** be unplugged from the mains when replacing the fuse as the mains inlet and fuse are at mains potential even with the unit switched off.

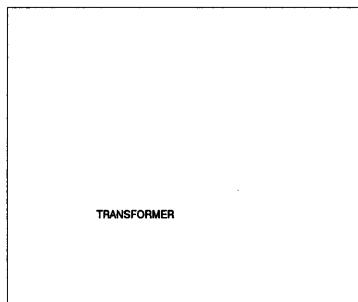
The Alpha 5 can be set for use on 230v or 115v mains supplies.

There are 2 mains fuseholders in the unit - one marked 230v & the other 115v and the fuseholder with the fuse fitted to it determines the working voltage.

To change voltage remove the fitted fuse and fit the correct fuse to the other fuseholder.

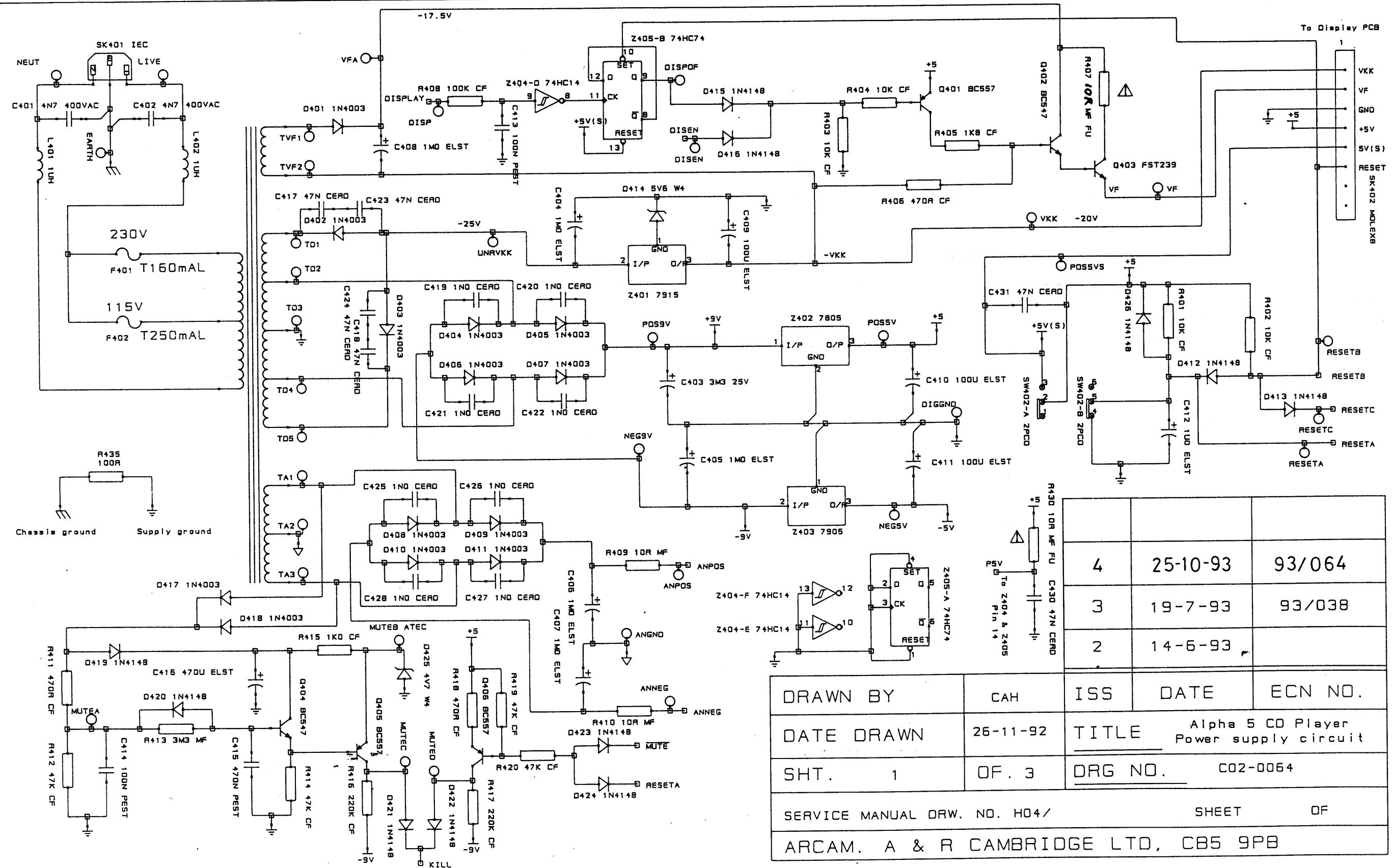


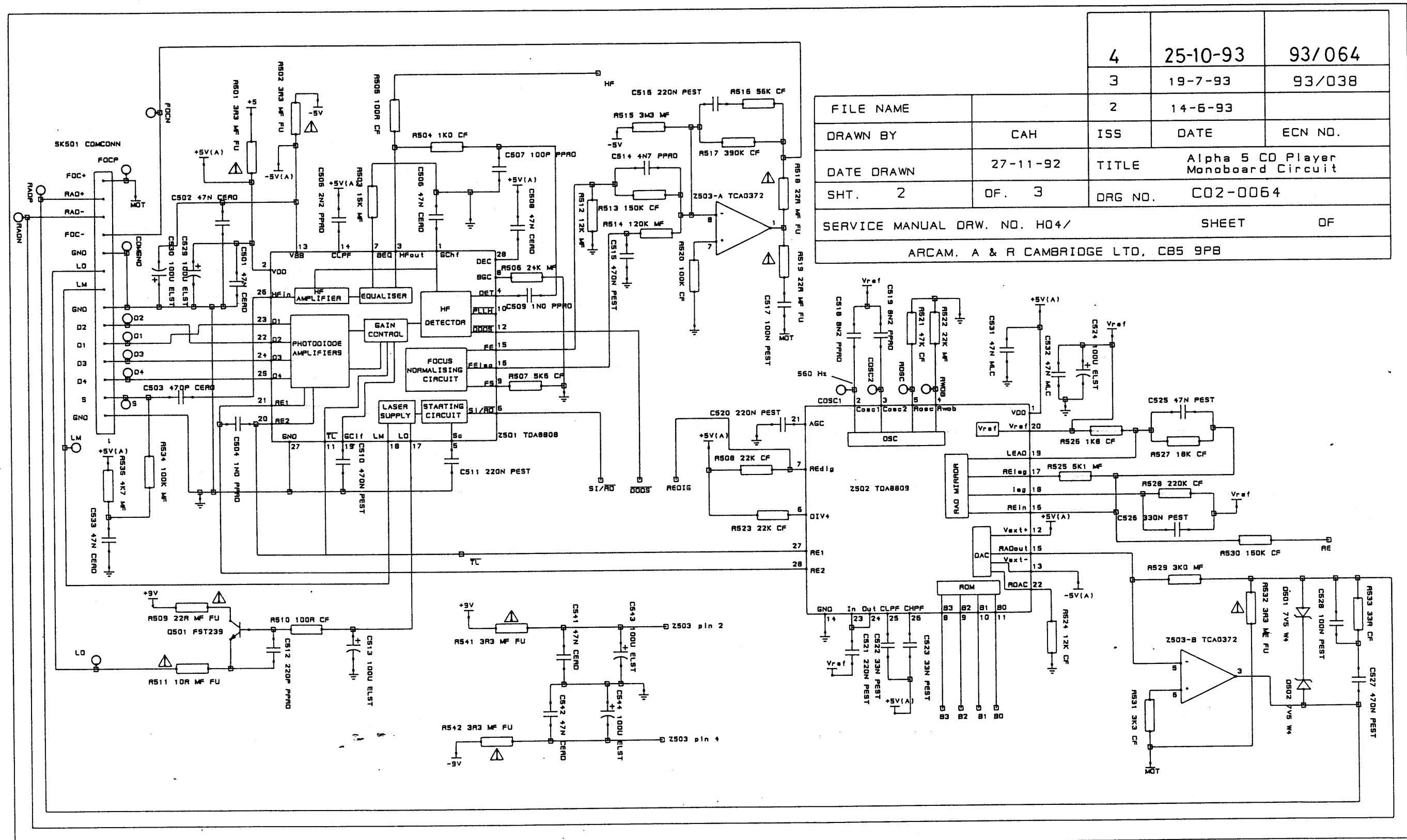
FIT ONE FUSE ONLY IN THE CORRECT HOLDER

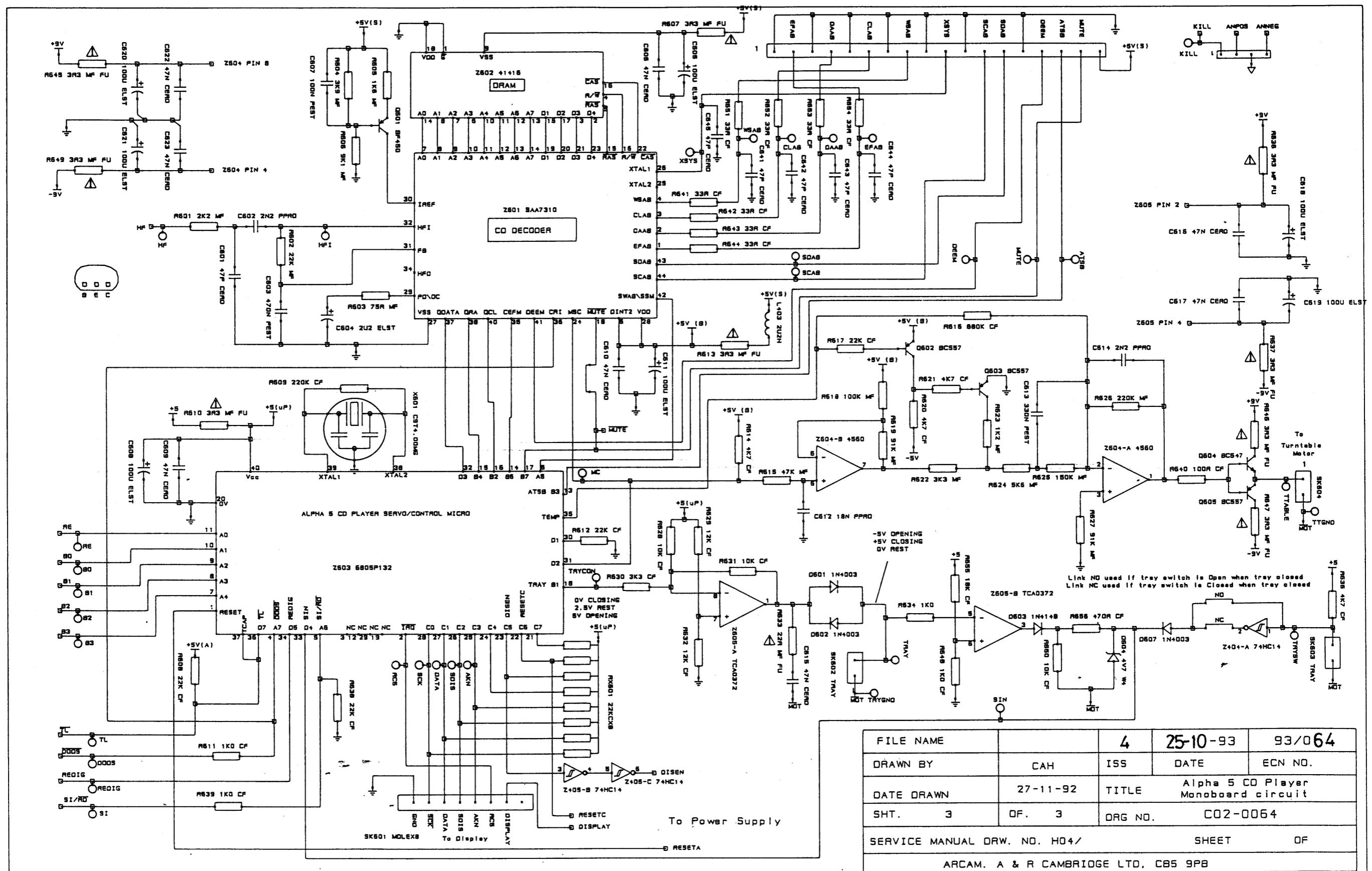


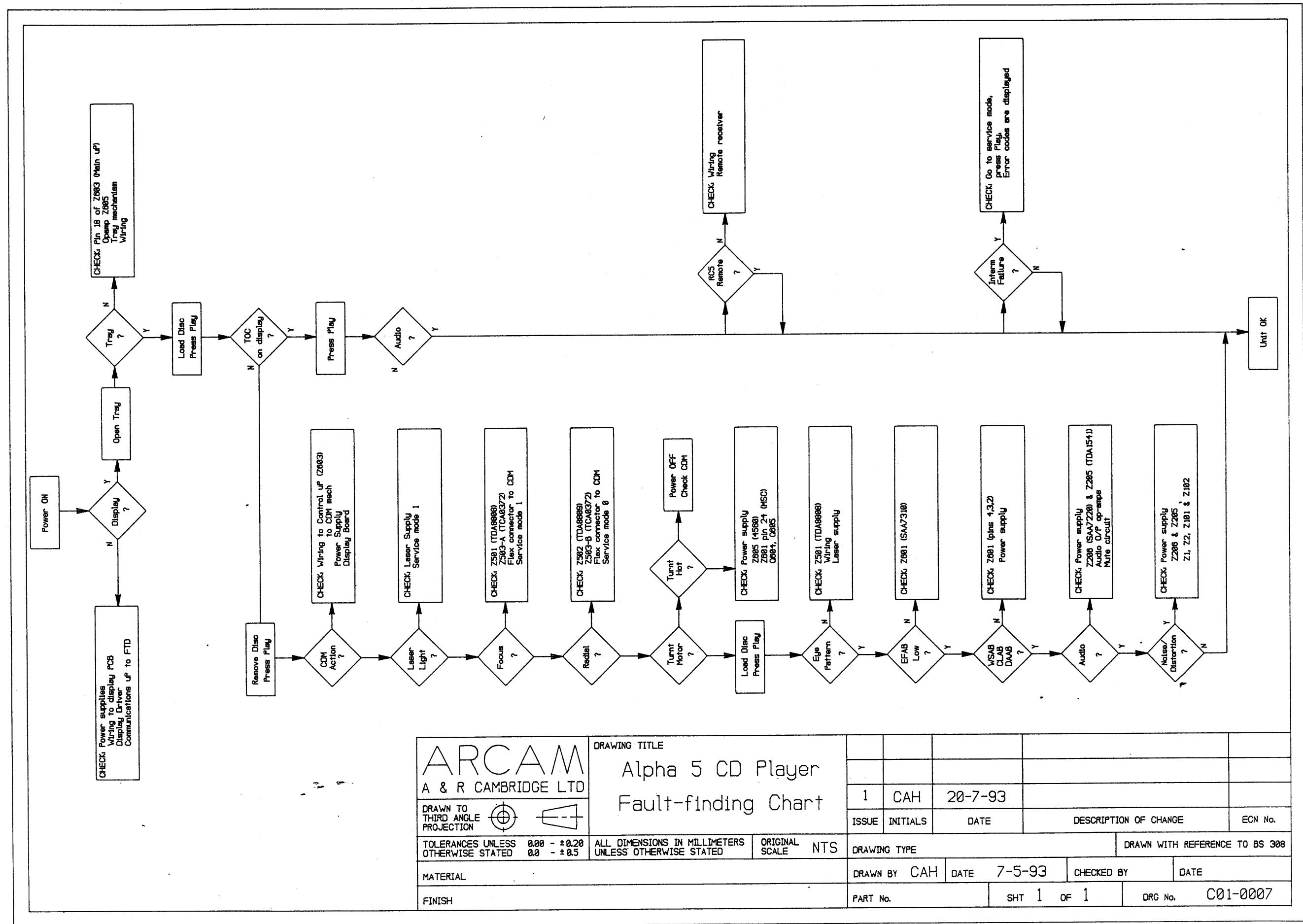
The correct fuses are: 160mA antisurge for 230v
 250mA antisurge for 115v

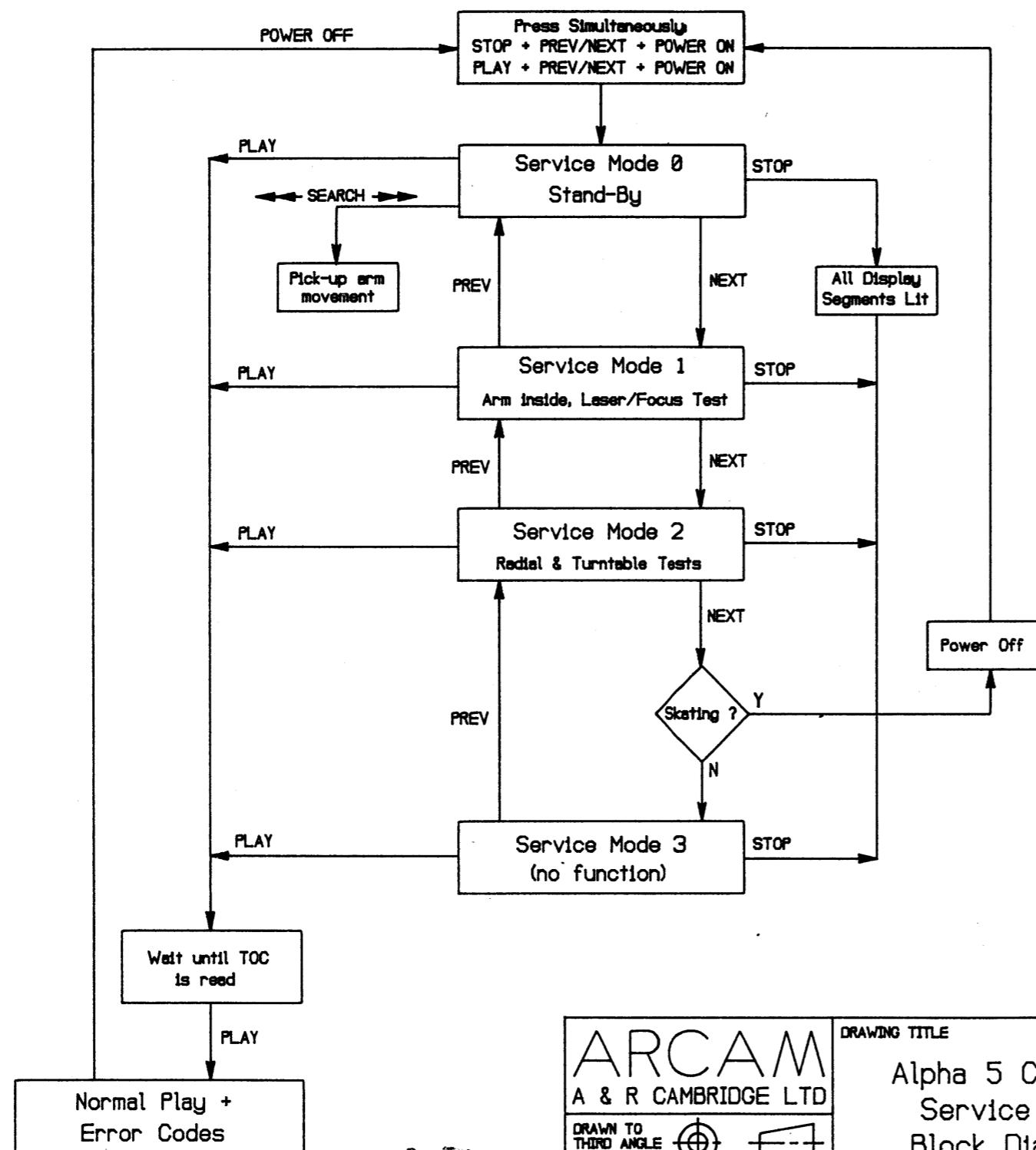
DIAGRAMS
ALPHA 5 BLOCK DIAGRAM
SERVICE MODE BLOCK DIAGRAM
FAULT FINDING CHART
MONO BOARD: POWER SUPPLIES
MONO BOARD: PHOTO DIODE & RADIAL ERROR PROCESSORS
MONO BOARD: SERVO uP & DECODER
AUDIO BOARD
DISPLAY BOARD











System Errors

- ERROR 01 Tray Error
 - ERROR 02 Focus Error
 - ERROR 03 Radial Error
 - ERROR 04 Disc Error - DRD not low
 - ERROR 05 TL low too long
 - ERROR 06 Jump Error
 - ERROR 07 Subcode Error
 - ERROR 08 TOC Error

ARCAM A & R CAMBRIDGE LTD	DRAWING TITLE Alpha 5 CD Player Service Mode Block Diagram					
		1	CAH	20-7-93		
DRAWN TO THIRD ANGLE PROJECTION	 	ISSUE	INITIALS	DATE	DESCRIPTION OF CHANGE	ECN No.
TOLERANCES UNLESS OTHERWISE STATED	8.00 - ± 0.20 8.0 - ± 0.5	ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED	ORIGINAL SCALE	DRAWING TYPE Block Diagram		DRAWN WITH REFERENCE TO BS 308
MATERIAL			DRAWN BY CAH	DATE 24-6-93	CHECKED BY	DATE
FINISH			PART No.	SHT 1 OF 1	DRG No.	C01/0006

