



LINN

LK85 & LK140 Service Manual

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Introduction

About this manual

This manual is designed to help you as a Linn Retailer or Distributor to provide the best possible service for your customer should a problem arise. The LK85 and LK140 share many design aspects and parts, so it makes sense to cover both amplifiers in the one manual. Most faults, cures etc apply to both amps and if no distinction is mentioned, it is safe to assume that it is applicable to both amps. They are not identical, however and any differences will be mentioned as they arise throughout the manual.

If you have any suggestions or comments regarding this manual, please contact Paul O'Neill at Linn

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Retailer & Distributor Obligations

Linn Specialist Retailers or Distributors are obliged to carry out the repairs in this manual under the terms of the contract & warranty agreements. You should return a faulty product to Linn for repair, only if the fault is not covered in this Service Manual. If a product, which is under warranty, is returned to Linn for repair and the fault is covered in the service manual, Linn may levy a charge and this charge should not be passed to the customer.

How to use this manual

The main body of this manual, the fault table, is designed to be as quick and simple as possible to use when you are confronted with a faulty product and so it is arranged by fault symptom as the symptom is usually all that you will know about the fault.

If you are unsure about the meaning of any words or phrases, look in the **Glossary**. (accessible via Linfo Website - Product Information)

Before embarking on any Service work, you should read the **Service Procedures** section (accessible via Linfo Website - Product Information), as there are certain procedures that must be followed in order to ensure the problem is resolved quickly and permanently.

Table of contents & fault symptoms

Look firstly at the table of contents and find the category that you covers the symptom you are seeing, then look down the list of faults in that section until you find the symptom or symptoms that best describe the problem.

Circumstances

Then simply follow the table along – the table specifies circumstances surrounding the fault symptom – e.g. whether the fault is likely to be intermittent or constant, if the fault only occurs within a range of serial numbers etc.

Possible causes

The next column details possible causes – this is effectively the most important section, probably the main reason you are looking at this manual at all. There may be several possible causes for the symptom you have – it is worth checking out all of these (maybe there is more than one fault). For some faults, simple checks are detailed that you can use to rule out the problem without replacing any parts, whereas for other faults, the simplest way to rule out the problem is to replace the component(s) listed

Cure

Quite simply the action that you must take to cure the problem.



Installation

Important Safety Information

Mains connections

This appliance **must** be earthed – both for Safety and functional reasons.

Lethal Voltages

Inside the amplifier, lethal voltages are present – do not touch any part of the circuitry with any part of your body or with metallic or conductive objects. Avoid especially the area around the mains inlet and its connectors

Installation

Unpack the product & retain the packing for future transportation.

As a Linn retailer, you are responsible for ensuring correct installation of the product. Consult the user manual and read the Placement & Handling information below.

Placement

Location & Environment

Do not locate near electronic products that may transmit RF, such as microcomputers, fax machines, TVs etc, or connect them to the same mains socket as these devices. Also avoid close contact with the mains or signal leads of such products – careful routing of the cable may be required.

Although the amplifier can usually be stacked along with other products with no problem, it is better if possible to keep it apart from other products to prevent its operation being adversely affected by the heat and strong electrical field emitted by some products. This is also advisable due to possibility of the heat and electrical field that, unavoidably, emanate from a product as powerful as the LK240/AV5105 from adversely affecting the performance of other adjacent products.

Avoid locations that have high humidity or the chance of the unit getting wet.

Avoid locations where there is a lot of dust.

Handling & general maintenance.

No standard maintenance is required, except perhaps re-connecting the plugs periodically to improve contact. Always handle the amplifier with great care.

Always turn off the unit and the pre-amp to which it is connected before connecting or disconnecting any plugs to/from the sockets at the back of the unit to avoid damaging the speakers etc.

If you are carrying out any work on the unit with its' sleeve removed, **ALWAYS** take anti-static precautions as tiny static discharges from your body, which you may be completely unaware of, can damage electronic circuitry and cause major problems. Anti-static earth mats & wrist straps must be used when handling any of the circuit boards or any spare parts.



Power-up problems

The following are some problems you may encounter when you power up the LK 85 or LK140.

| Power up problems | | | |
|---|--|--|--|
| Symptom | Circumstances | Possible Cause(s) | Cure |
| Won't power up. Power LED dead & no function | Constant | Fuse blown in unit and/or in mains plug. | Replace fuse(s) with correct value & type. Fuse in mains lead should be 5A. Fuse in the mains inlet of the amp should be "Slow Blow" – look for a 'T' before the rating on the fuse. Correct types are: 100 - 115V - 6.3A 220 - 240V - 3.15A |
| Power LED dead | May be intermittent | Power LED faulty Or Fallen out of its place in the facia Or Has a bad connection | Check that power led is correctly fitted to its socket in the facia. Check that it is making good electrical contact (pushed fully into socket on board etc.) If faulty, replace – Linn part no: CONN 702. |
| Power LED is red | May be intermittent | Unit is in Standby or is in Trip | See User Manual See ' Stand-By Problems ' section. See ' Protection Problems ' section |
| Won't power up - Power LED dead & no function | May be intermittent – may die intermittently or sometimes may not power up | Mains lead faulty | Replace faulty mains lead. |
| Doesn't power up | May be intermittent | Wrong voltage for amplifier type – mains voltage is too low. (e.g. 240V unit being used with 115V mains supply.) | Check voltage rating at rear of unit. If you have the wrong amplifier type, you will require to replace the mains Transformer with the correct type – Linn part nos: LK85 230V - MCAS 030/230 115V - MCAS 030/115 100V - MCAS 030/100 LK140 230V - MCAS 033/230 115V - MCAS 033/115 100V - MCAS 033/100 |



| | | | |
|---|--|--|--|
| Doesn't power up or Powers up (power LED may be lit) but no function. | Intermittent - tapping or bumping the unit makes fault come & go | Bad connection either inside or outside the unit. | Find and eradicate bad connection. It may be something as simple as a connector not pushed fully home and may be easily visible. If fault is intermittent, see Introduction to Fault Finding section (paragraph on intermittent faults - accessible via Linfo Website - Product Information). If fault is not intermittent, it may be possible to trace the fault – again see Introduction to Fault Finding – Substitution & Isolation |
| Unit dies intermittently | At any time | Mains voltage dropping too low for unit to function correctly (known as 'Brown outs' as these voltage drops also sometimes cause the lights to dim.) | Consult an electrician or your power company. |
| Unit does not power up or powers up & then dies May die intermittently or briefly and then come back on again. | May be intermittent | Mains inlet faulty | Replace mains inlet – Linn part no: CONN 385 |
| Unit does not power up or powers up & then dies May die intermittently or briefly and then come back on again. | May be intermittent | Transformer faulty | Replace transformer – Linn part nos: LK85 230V - MCAS 030/230 115V - MCAS 030/115 100V - MCAS 030/100 LK140 230V - MCAS 033/230 115V - MCAS 033/115 100V - MCAS 033/100 |

| <u>Fuse blowing</u> | | | |
|---------------------|---------------------|---------------------------|---|
| Symptom | Circumstances | Possible Cause(s) | Cure |
| Fuse blowing | May be intermittent | Wrong type of fuse fitted | Replace fuse(s) with correct value & type. Fuse in mains lead should be 5A. Fuse in the mains inlet of the amp should be "Slow Blow" – look for a 'T' before the rating on the fuse. Correct types are: 100 - 115V - 6.3A 220 - 240V - 3.15A |
| Fuse blowing | May be intermittent | Mains surges | Consult an electrician or your power company. |



| | | | |
|--------------|--|---|---|
| Fuse blowing | May be intermittent | Wrong mains voltage for unit voltage setting - mains voltage is too high, e.g. 115V unit connected to 230V mains. If the voltage setting is slightly off (e.g. the unit is set to 100V but used with 115V mains), the fuse may blow occasionally. | Replace fuse WITH CORRECT TYPE & RATING and replace mains transformer with correct type to correspond with Mains used. Transformer part nos: LK85 230V - MCAS 030/230 115V - MCAS 030/115 100V - MCAS 030/100 LK140 230V - MCAS 033/230 115V - MCAS 033/115 100V - MCAS 033/100 |
| Fuse blowing | May be intermittent but usually constant | Transformer faulty. To check if it is definitely the transformer, power down the unit, replace fuse, disconnect the transformer output from the Main board and power up. If the transformer IS the cause, the fuse will continue to blow. If the fuse remains intact, the fault is more likely to be on the Main board. Try another transformer of the same type if you have one. | Replace transformer – Linn part nos: LK85 230V - MCAS 030/230 115V - MCAS 030/115 100V - MCAS 030/100 LK140 230V - MCAS 033/230 115V - MCAS 033/115 100V - MCAS 033/100 |
| Fuse blowing | May be intermittent | Faulty mains inlet | Replace mains inlet – Linn part no: CONN 385 |
| Fuse blowing | May be intermittent but usually constant | Bridge rectifier diodes – D1, D2, D3 or D4 internally short circuit. It is usually very easy to measure which (if any) of these diodes have gone faulty – a faulty diode will measure short circuit or very low impedance (a matter of a few ohms only) in both directions. | Replace faulty diode – Linn part no: MISS 287. |
| Fuse blowing | May be intermittent but usually constant | Fault inside unit, e.g. short circuit or similar. | See Introduction to Fault Finding section (accessible via Linfo Website - Product Information) for tips on tracing the fault. |



Protection (Tripping) Problems

Important information about Trip – please read before fault finding on Trip problem.

About LK85/LK140 Trip

Contained in the following table are some problems you may encounter with regards to the amplifier going into protection, 'Protection' is also referred to as 'Trip.'

The unit's protection circuitry can be tripped by over-temperature or over current conditions – be aware that trip usually occurs for a very good reason & is indicating the presence of a situation that is potentially harmful to the unit, the speakers or some other aspect of the system. **Most trip situations are genuine and caused by a problem with the system or the set-up, not the unit.** If this is the case, you must isolate & remove the source of the problem from the system – see **Introduction to Fault Finding** (accessible via Linfo Website - Product Information) for tips on how to do this. This manual deals mainly with LK85/LK140 failures, not so much with failures in other parts of the system.

To clear trip, the cause of the trip situation must be removed. If the amp has been tripped by overheating, the unit must be allowed to cool down and it will then start working normally. If overloading has caused the problem, the cause (faulty speaker or whatever) must be removed.

Occasionally however, there may be a tripping problem, which is caused by a fault in the unit itself. If unsure whether or not the unit is faulty, compare the 'faulty' unit with a working one under **identical** circumstances.

How to tell if an LK85/LK140 has tripped

If the unit has tripped, the most obvious symptom is that there is no output from the unit. However, trip is not the only thing that can cause this – other problems can cause the sound to die. To distinguish trip from these other causes, look at the power LED - an LED on a unit that has tripped will be red in colour. Be aware, however, that the LED also goes red if the unit is in standby – ensure the input is connected and has music playing. See '[Information about the Stand-by facility](#)' section below if unsure.

Explaining Over-temperature Trip

This can be difficult to explain as there are so many factors involved simultaneously, all of which have an effect on the over-temperature trip circuit. Under certain circumstances, heat builds up due to the fact that it is being generated faster than it can be dissipated.

One such circumstance would be working hard - for the amp this means playing music loudly or driving a hard load. The longer and harder it works, the hotter it gets – and if allowed to continue, something must give - the amp may trip to avoid destroying itself. An amp driving 2 sets of low impedance speakers or playing heavy rock music at high volume is working very hard. An amp driving a single set of 8ohm speakers or playing classical music at moderate volume is not working very hard.

Another circumstance is ventilation. If the amp is working inside a closed cupboard with no airflow, or working while surrounded by other devices, the heat will build up much quicker (even if not working very hard) and it may trip.

Another circumstance is the ambient or even the local temperature. If the amp is working while situated on top of or sandwiched between working power amps, working beside a heater or working in a warm room the heat will build up and it may trip.

All of the above circumstances combine simultaneously (to varying degrees) to affect the amp. There are favourable and unfavourable combinations. The most unfavourable combination would be something like: playing heavy rock music at high volume through 2 pairs of low impedance speakers on a hot day with the unit in a small cupboard along with 2 other power amps with no ventilation or airflow. Sometimes a favourable circumstance may cancel out an unfavourable one – e.g. it may be possible to play music loudly for a very long time if the unit is well ventilated in a cool room. The trick is to maximise the favourable aspects and minimise those that are unfavourable.



| <u>Trip problems – Fault Table</u> | | | |
|--|--|--|--|
| Symptom | Circumstances | Possible Cause(s) | Cure |
| Amp shutting down (LED goes red, music dies) after 10 or 20 minutes. | Probably intermittent - depending on what type of music is played and how loudly it is being played. | Amp is not actually tripping but is going into stand-by and sensitivity is set to minimum (or close to minimum) on affected channel(s). | Adjust sensitivity closer to maximum. |
| Amp tripping | Probably intermittent | Amp is tripping to protect itself due to the presence of a potentially damaging situation (over-heating, over-current etc) If unsure, compare 'problem' unit with a known good unit under identical circumstances. | See above section - 'Important Information about Trip' |
| Amp permanently tripped | Probably constant The above Trip faults have been ruled out. | Monolithic IC(s) (U100, U101, U200, U201) blown. Please note – U100 & U201 are only fitted to the LK140 | It is advisable to replace the entire board, as blown monolithics often destabilise the board – repair is not normally reliable. |



Stand-by Problems

Information about the Stand-by facility

Stand-by on these amps should work as follows:

- On leaving the factory, the amp is set to automatically go into stand-by if no signal is detected for 10 minutes.
- The Stand-by timing can be adjusted by moving a link inside the amp – it can be set to go into stand-by after 10 or 20 minutes.
- The above Stand-by facility can be over-riden by moving the link to 'on' – this means the amp will stay on and never go into stand-by.
- Early units' stand-by was configured differently – Stand-by could be set to 'stand-by' (unit goes into stand-by after about 15 minutes if no signal is sensed) or 'on' – unit stays on & does not go into stand-by.
- If the unit is in stand-by and a signal (music) is sensed at the input, it comes out of Stand-by
- The sensitivity of the input signal sensing can be adjusted. Maximum sensitivity means that the amp will come out of stand-by if even a very quiet level of music signal is detected. This level of sensitivity can sometimes cause problems if there is noise (hum, hiss etc) in the system – the amp may never go into stand-by or may come out of stand-by when it shouldn't. Minimum sensitivity means that it takes an extremely high volume level of music to bring the unit out of stand-by. Usually closer to Max sensitivity is preferable and adjust if this causes a problem.

The following table contains problems you may encounter with the 'Stand-by' facility on the LK85/LK140.

| <u>Stand-by Problem Table</u> | | | |
|---|---|--|--|
| Symptom | Circumstances | Possible Cause(s) | Cure |
| Amp goes into stand-by while music is playing. | Probably intermittent, depending on what type of music is played and how loudly it is being played. | Sensitivity is set to minimum (or close to minimum) on affected channel(s). | Adjust sensitivity closer to maximum. |
| Unit never comes out of stand-by. | Probably constant The above Stand-by faults have been ruled out. | Monolithic IC(s) (U100, U101, U200, U201) blown. Please note – U100 & U201 are only fitted to the LK140 | It is advisable to replace the entire board, as blown monolithics often destabilise the board – repair is not normally reliable. |
| Unit never comes out of stand-by. | Probably constant The above Stand-by faults have been ruled out. | U1 and/or U2 faulty – pulling 'stand-by' line down. | Replace faulty part(s) – Linn part nos: U1 - IC 132 U2 - IC 362 |
| Unit never goes into Stand-by, no matter how long it is left with no music playing. | May be intermittent | Sensitivity is set to maximum and noise in the system (hum, hiss etc) is preventing the unit going into Stand-by. | Adjust sensitivity. |
| Unit never goes into Stand-by, no matter how long it is left with no music playing. | Probably constant | Internal adjustment link (near the centre of the board, adjacent to the large capacitors) is set to 'ON'. This is the setting that disables the stand-by function. | Move link to '10 mins' or '20 mins' depending on how quickly you wish the unit to go into stand-by. |



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| Unit never goes into Stand-by, no matter how long it is left with no music playing. | Probably constant | U3 (binary counter) faulty. U3 is the IC that counts up to 10 minutes or 20 minutes and then tells the unit to go into stand-by. If it is faulty, it may never give that signal. | Replace U3 – Linn part no: IC 205. |
|---|-------------------|--|------------------------------------|



Amplifier & Audio Problems

The following are some problems you may encounter with the audio output of the LK85 or LK140. It is assumed at this point that it is definitely the LK85 or LK140 that is causing the problem and you have ruled out all other aspects of the system. If you have not – please do so before proceeding.

| <u>Amplifier & Audio problems</u> | | | |
|---|---|--|---|
| Symptom | Circumstances | Possible Cause(s) | Cure |
| No output from one or both channels. May be accompanied by a popping or buzzing noise. | Probably constant. Ensure, however, that the amp is not tripped and is not in Standby (See Trip and Standby sections above) | Monolithic IC(s) (U100, U101, U200, U201) blown. Please note – U100 & U201 are only fitted to the LK140 | It is advisable to replace the entire board, as blown monolithics often destabilise the board – repair is not normally reliable. |
| Clicking, buzzing or popping noise at output of both channels. | May be intermittent, but probably constant | Links at P10 & P11 connectors (found at left-hand edge of board, roughly ½ way back) fitted at wrong position or fitted when they should not be. | The only link fitted should be shorting together the two pins marked 'Fit after burn-in'. All other pins should be left unlinked. |
| Output is mono, not stereo – even if balance is adjusted on pre-amp, output of both channels of power amp remain equal. | May be intermittent, but probably constant | Links at P10 & P11 connectors (found at left-hand edge of board, roughly ½ way back) fitted at wrong position or fitted when they should not be. | The only link fitted should be shorting together the two pins marked 'Fit after burn-in'. All other pins should be left unlinked. |
| Thumping/ banging noise through speakers when switching between inputs of pre-amp | May be intermittent, but probably constant | Links at P10 & P11 connectors (found at left-hand edge of board, roughly ½ way back) fitted at wrong position or fitted when they should not be. | The only link fitted should be shorting together the two pins marked 'Fit after burn-in'. All other pins should be left unlinked. |

| <u>DC at the output</u> | | | |
|--|---|--|--|
| Symptom | Circumstances | Possible Cause(s) | Cure |
| DC (around 2V) at the output of both channels. | Only happens when unit is not connected to speakers and/or pre-amp. | This is normal and causes no problem, as the fault only occurs when the amp is not connected to anything. As soon as the input/output is connected, the DC disappears. | No cure necessary. |
| DC voltage at the output of one or both channels | Probably constant | Monolithic IC(s) (U100, U101, U200, U201) blown. Please note – U100 & U201 are only fitted to the LK140 | It is advisable to replace the entire board, as blown monolithics often destabilise the board – repair is not normally reliable. |

