



AMIS60/120 Series Service Manual

**Product Description
Set-Up/Test Procedures
Component Lists
Full Schematics
PCB Overlays**

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AMIS60/120

Product Description

The AMIS60 and AMIS120 mixer amplifiers are designed for commercial installations. Both models operate on [230/240 VAC, 50Hz] (240V version)/[115VAC, 60Hz] (115V version) or 24 VDC, and may be desk or rack mounted (rack mount kit supplied fitted). Both amplifiers incorporate a 6 zone 100 volt line speaker zone selector with "All Call". The AMIS60 will deliver 60 watts into a load of 8 ohms, 70 volt or 100 volt line. The AMIS120 will deliver 120 watts into a load of 4 or 8 ohms, [70 volt or 100 volt line] (240V version)/[70 volt or 25 volt line] (115V version). Both Models feature 4 universal mic/line inputs, and an insert point for additional EQ or feedback exterminator if required. The AMIS60/120 also feature a dual RCA tape output while a balanced, 700mV XLR output is also provided to feed up to six power amplifiers. Other standard features include on-board Bell, Pre Announce, Alert & Evac tones, Remote Master VCA Control & dual stage priority muting. As standard, both models are self standing and come with rubber feet. They may be stacked to a maximum of four units high. [The 115V version also has a transformer balanced, 600 ohm telephone input] (115V version).

AC Power Inlet

The 3 pin IEC power inlet is located on the bottom left of the rear panel and accepts a standard mains power lead fitted with an IEC connector. Before plugging in a power lead, please check the rear panel of the amplifier to ensure that the voltage switch is set correctly for your part of the world.

The operating voltage is [230/240 VAC @ 50 Hz] (240V version)/[115 VAC @ 60 Hz] (115V version). (240V version) [The inlet is equipped with an inbuilt AC fuse holder fitted with a 4 amp fuse (ACM120) or a 2 amp fuse (ACM60) plus a spare within the holder]. (115V version) [The inlet is equipped with an inbuilt AC fuse holder fitted with an 8 amp fuse (AMIS120) or a 4 amp fuse (AMIS60) plus a spare within the holder].

Power consumption is approximately 125 VA for the AMIS60 and 250VA for the AMIS120.

24 Volt DC Power Inlet

The AMIS60 & AMIS120 feature optional 24VDC power to run off a battery supply if required. This is connected via the rear terminal strip. The front panel Power Switch will not switch DC power 'on' or 'off' in DC operation. In this mode the amplifier is always 'on'.

There is no trickle charge resistor across the diode (one diode of a bridge rectifier).

[230V/240V Slide Switch] (240V version)

The operating voltage of the amplifier is user selectable between 230V and 240V via a slide switch located on the top left side of the rear panel. This switch should be set to match the AC voltage of your country. The mains transformer is wound with a 230V winding plus a 10V winding internally connected.

Power Amp

The power amp is a push pull single supply amplifier driving a centre tapped transformer. The amplifier has an overall gain of approximately x10 and the transformer has a turns ratio of approximately [x7] (240V version)/[x5] (115V version). The sensitivity of the amp is approximately 2.7V.

A particularly good aspect of this amplifier is the current limiting circuit. The sensing circuit is a standard rail load line limiting circuit but it is the drive circuit that is important. As transistors V12 & V14 (BC640) turn on transistor V11 (BC639), it pulls bias current away from the amp through diodes D1 & D4 (BAV21) and pulls drive away from the op amp IC1 (LM1458) through the diode/resistor pair D2/R12 (BAV21/2k2) & D3/R23. Individually each topology acts to limit the current in the amp but it is the combination of the two and the fine tuning of there interaction that produces the characteristic soft limiting without the harsh crossover distortion. It is not until the amp is in hard clip does the amp produce the high freq crossover

distortion. This makes for nice sounding current limit that allows for soft distorted peaks to get through but limits continuous excessive current while maintaining thermal stability.

Speaker Output Terminal Strip

(240V version)

The screw terminals on the left hand side of the strip allow access to the direct speaker outputs of the amplifier. Reading from left to right the terminals are:

COM	Common or “-” for low impedance speaker loads (4 or 8 ohms).
4	Positive “+” for 4 ohm speaker loads (use with common) (AMIS120 only)
8	Positive “+” for 8 ohm speaker loads (use with common)
COM	Common or “-” for 70v or 100v speaker loads (maximum load of 80 ohms at 100v AMIS120 & 160 Ohms at 100v AMIS60)
70	Positive “+” for 70v line speaker loads (use with common)
100	Positive “+” for 100v line speaker loads (use with common)

Please ensure that the correct “Common” is used. Low impedance and 70/100v loads can be used simultaneously but please pay careful attention to the overall speaker load.

Note: The minimum impedance (or maximum load) at 100 volt line should be no less than 80 Ohms for the ACM120 and no less than 160 Ohms for the AMIS60.

(115V version)

The screw terminals on the left hand side of the strip allow access to the direct speaker outputs of the amplifier. Reading from left to right the terminals are:

COM	Common or “-” for low impedance speaker loads (4 or 8 ohms).
4	Positive “+” for 4 ohm speaker loads (use with common) (AMIS120 only)
8	Positive “+” for 8 ohm speaker loads (use with common)
COM	Common or “-” for 25v or 70v speaker loads (maximum load of 40 ohms at 70v AMIS120 & 80 Ohms at 70v AMIS60)
25	Positive “+” for 25v line speaker loads (use with common)
70	Positive “+” for 70v line speaker loads (use with common)

Please ensure that the correct “Common” is used. Low impedance and 25/70v loads can be used simultaneously but please pay careful attention to the overall speaker load.

Note: The minimum impedance (or maximum load) at 70 volt line should be no less than 40 Ohms for the ACM120 and no less than 80 Ohms for the AMIS60.

Terminal Strip

The remaining terminals read as:

Spare
Tone Generator Common (use with one of the 4 tones listed below)
Pre-Announce Chime
Alert Tone
Bell Chime
Evacuation Tone
24 volt DC
Vox Relay Out
VCA

[600 Ohm Telephone Input] (115V version)

Switched Speaker System

Speaker (Zone) Output Terminal Strip

Reading from left to right, these screw terminal pairs correspond to the switched line voltage outputs and are numbered 6 through 1 as indicated on the front panel of the amplifier. For each pair, the left hand terminal is the line voltage output and the right hand terminal is the common.

All Call Button

When pressed, the All Call button will connect the line voltage output of the amplifier to all 6 of the switched outputs.

Speaker (Zone) Selector Switches

These 6 black buttons are for switching the line voltage output of the amplifier to any combination of the 6 available speaker zones. The maximum capacity of each speaker zone is 60 watts so care should be taken to ensure that no individual zone is loaded down with any more than 60 watts, always remembering that the total load for the AMIS60 is 60 watts and for the AMIS120, 120 watts in total. Eg: it is possible on the AMIS120 to safely have one zone loaded with 60 watts and the remaining five loaded with 12 watts each.

All switches are latching and non-interlocking.

Phantom Power Button

This button enables or disables the 15 volts DC phantom power to all microphone XLRs. Do not plug an unbalanced microphone in to any amplifier or mixer when phantom power is switched 'on'.

The phantom voltage is connected through 4k7 1/4W resistors. The maximum current draw available per microphone is approximately 3mA.

Line Output

The balanced XLR line level output provides a maximum of 700mV to allow for the connection of up to 6 power amplifiers. Pin connections are: pin 1-earth; pin 2-signal (hot +); pin 3-signal (cold -).

The output is electronically balanced with an inverting op-amp and buffered with voltage follower op amps. Neither hot nor cold output should be grounded when connecting as unbalanced.

Tape Output

Dual RCA output connectors provide a line level output with a maximum of 350mV into 10k Ohms. This output is sourced before the master gain control so the tape output level is not influenced by the operation of the master gain control.

Microphone Inputs

All four inputs are dual mic/line with microphone inputs being via a 3 pin XLR connector per channel. The mic input sensitivity is 1mV @ 200 ohms. Pin connections are: pin 1-earth; pin 2-signal (hot +); pin 3-signal (cold -). Phantom power of +15 volts is available on all microphone inputs. Reading from left to right across the rear panel, the inputs are 4, 3, 2, & 1.

Line Inputs

All four inputs are dual mic/line with line/auxiliary inputs being via dual RCA connectors per channel. Line inputs 1, 2 & 3 have an input sensitivity of 150mV @ 100K ohms. Input 4 has an input sensitivity of 300mV @ 220K ohms making it suitable for high level inputs such as a CD player. Reading from left to right across the rear panel, the inputs are 4, 3, 2, & 1.

[600 Ohm Telephone Input] (115V version)

The 600 ohm transformer balanced Telephone Input is summed with input 2 through 100k ohms.

The input sensitivity is 150mV (driving the amp to full power)

Insert Point

The Insert Point is located electronically after the master volume pot and before the balancing circuit for the power amp and line output.

The Insert Point is a 3 conductor (Tip, Ring, Sleeve) phone socket which accepts a standard stereo 6.35mm (1/4") jack. The connections are:

Tip	Amplifier in.
Ring	Mix Output.
Sleeve	Ground

The switched contacts are used to break the signal internally.

When an external processor is used via the insert point, it only affects the power amplifier section and line output of the AMIS60 & AMIS120. The tape output remains unprocessed.

VOX Relay Output

The terminal strip to the immediate right of the AC inlet features a relay output. This relay is deactivated when signal becomes present at any of the priority inputs. This would normally be inputs 1 and 2; however these channels can be removed from the priority bus via internal links. The unit is shipped from the factory with inputs 1 and 2 having priority. The emergency tones also deactivate the relay. The relay can also be removed from the priority bus allowing muting to occur without operation of the relay.

The relay outputs are C (Common), NO (Normally Open) and NC (Normally Closed). The NO or NC selection provides the installer with the option of the relay either opening or closing a contact. This feature is normally used in conjunction with relay override attenuators (volume controls). In this application, the relay output could trigger an accessory power supply which in turn bypasses the remote attenuators. The result is that priority inputs will always be heard irrespective of the attenuator setting. The relay contacts are 3 amps at 125VAC/30VDC.

The relay outputs are marked in the fail safe position, i.e. power off. When power is applied and no signal is present the relay energizes through transistor V3 (BC546). This transistor is turned on by IC5B (LM358 or equivalent). This output is normally high. Switch on and switch off times are controlled by the time constants of the RC network of C21 and R77. The switch off time is determined by the current sinking capabilities of the LM358 through diode D4 (BAV21 or equivalent). This time can be considered instant. The on time is determined by the charge time of C21 (22uF) through R77 (22k). This is approximately 2 seconds. It must be remember that the relay circuit is designed to be fail safe so that when power is on the relay is on and therefore the relay must turn off quickly (when priority is on) and on slowly (when priority is off). This is to avoid chatter of the relay.

VCA Control

An external pot (500K) can be connected to the AMIS60/120 for remote control of the master level. The external pot is governed by the master level of the amplifier allowing the installer to set the volume, then lock the amplifier in a rack, leaving the user with just a master volume control that cannot go beyond the

level set on the master (front panel) control. Connection is via a 2 wire terminal strip on the rear panel of the amplifier. Shorting this input will mute the amp.

The VCA IC has a Voltage/Gain ratio of approximately -3mV/dB. That is a voltage difference of approximately 300mV below the reference voltage (pin3, ~7.5V) will provide full mute (-80dB). The need to have the remote pot on two wire connection means that there is a small amount of attenuation (approx 1dB) when the pot is connected. For the best audio control a log pot should be used. The control circuitry is a DC attenuator and an inverter. When a pot is connected, the current through R64 (10k) and the pot resistance generated from the 1/2Vcc bias voltage flows through R76 (330R). This generates a voltage increase on the output of op amp IC7B (LM1458 or equivalent) above the reference voltage (1/2Vcc). The second op amp IC7A (LM1458 or equivalent) inverts this voltage to a voltage difference below the reference voltage. Thus if the pot is turned to S/C the voltage difference below the reference voltage is:

$$7.5(\text{V}) / 10(\text{kohm}) * 330(\text{ohm}) = 248(\text{mV}) = 248(\text{mV}) / -3(\text{mV/dB}) = -82(\text{dB})$$

From this you can see that when a 500k pot is attached the initial attenuation is:

$$7.5(\text{V}) / 510(\text{kohm}) * 330(\text{ohm}) = 4.85(\text{mV}) = 4.85(\text{mV}) / -3(\text{mV/dB}) = -1.62(\text{dB})$$

These calculations are only approximate and are used to show operation of the circuit.

Tone Generators

Four separate tones are available from the in-built tone generator board. All four tones can be activated individually via a contact closure connected to the screw terminals on the rear of the amplifier. When any tone is activated, all inputs (except for inputs 1 and 2) will automatically mute. The level of the tone generator is controlled by the pot labelled R6 (located behind the Bass adjustment pot). This pot adjusts the level for all 4 tones.

Tones available on the AMIS60 and AMIS120 include:

- Evacuation Tone
- Alert Tone
- Bell Tone
- Pre-Announce Chime

These inputs are pulled up to 5VDC internally through 1k resistors.

The tones are generated through a combination of digital frequency modulation and analogue amplitude modulation. The output of the microcontroller IC13 (PIC16C54A) on pin 17 is a 0-5V square wave of varying frequency (depending on the tone selected). This signal is amplitude modulated using a VCA IC8 (M5222P). The envelope is controlled by the charging and discharging of the electrolytic capacitor C47 with the sink and sourcing of current on the microcontroller outputs pins 1, 2 & 13.

Page Chime Enable Button

This allows the user to disable or enable the Pre-Announce Chime. This switch does not activate the chime. Activation is accomplished via the rear panel barrier strip (normally wired to a paging microphone). If the pre-announce chime is connected to a paging microphone (meaning that it would be activated by the switch on the microphone), the Page Chime Enable switch on the front panel of the amplifier allows the user to disable the chime function on those occasions when it is not required.

VOX Muting

This feature provides automatic muting channels 3 & 4 when signal is applied to either channels 1 or 2. It is normally used so that a paging microphone can have priority (by muting) over background music. The muted channels will automatically ramp back up to normal volume when the signal on channels 1 and/or 2 is no longer active. The amplifier ships with the VOX muting function enabled. To disable the VOX

muting move the jumper (labelled JP2, located just to the left and behind the level pot for channel 1) to the middle and left pins. (Factory setting is with VOX enabled with the jumper on the middle and right pins).

Channels 3 & 4 are summed through IC1B (LM1458 or equivalent) to the VCA IC4 (M5222P) which does the muting. The VCA is held on (i.e. no attenuation) by R55 (10k) pulled to the reference voltage and the reverse biasing of diode D3 (BAV21 or equivalent) by R22 and R21. This is to eliminate any attenuation by the op amp IC1A (LM1458 or equivalent) and its $\frac{1}{2}$ supply which may be different to the internal reference voltage of the VCA.

The control pin of the VCA is pulled down by op amp IC1A. This op amp runs at very high gain to activate on even very small signal. The jumper JP2 shorts out the feedback resistor thus removing the sensitivity. The attack of the muting circuit is controlled by the charging of C13 (47uF) through R22 (100k) and the release by the discharge of C13 through R37 (2k2). Note that VCA will mute at 250mV (-80dB) below the reference voltage so the muting will occur only over the range of approximately (depends on VCA production batch) 7.2V to 7.5V. The charging of the capacitor occurs from approximately 1V to 8.1V.

VCA M5222P pin out

- 1 – Output1
- 2 – Input1
- 3 – Reference voltage ($\frac{1}{2}$ Vcc)
- 4 – Gnd
- 5 – Control
- 6 – Input2
- 7 – Output2

Note: The M5222P is a current in, current out device. Voltage conversion is done through resistors. The maximum input current is 50uA rms. Current gain is 0.5.

Fuse Sizes

(240V version)

Mains AMIS60, 230 VAC: 2 Amperes Slow Blow

Mains AMIS120, 230 VAC: 3.15 Amperes Slow Blow

(115V version)

Mains AMIS60, 115 VAC: 3.15 Amperes Slow Blow

Mains AMIS120, 115 VAC: 4 Amperes Slow Blow

The DC fuse is located on the circuit board. This is a feature of the AMIS series amplifiers, which are equipped with a current limiting circuit preventing excessive DC currents, thus eliminating the risk of blowing high tension fuses. In the unlikely event that the DC fuse actuates, the output transistors should be checked, as it is probable that the amplifier has been subjected to very extreme conditions. The DC fuses are 10A time lag fuses.

TEST PROCEDURE MODEL - AMIS 120

1. Perform physical inspection (Visual Inspection stage).

1.1 Check:

- Earth connection for good contact (XLR GND to AC earth),
- All wiring points for good contacts (soldering and crimping)

PRETESTING

PRE TESTING SETUP REQUIREMENT

- a Oscilloscope.
- b Variac.
- c Multimeter.
- d Load [4Ω]
- e Signal generator.

1.1. Connect amplifier to:

- Variac (0Vac),
- Signal generator (mic1, no signal),
- Resistive load (4Ω on 4Ω terminal).

1.2. Reset controls:

- Volume controls to minimum,
- Bass/treble control to center,
- Phantom power switch to off,
- R33 & R34 (Bias adjustment pots) on the amplifier PCB fully anticlockwise.

2. Power up :

- 3.1 Turn on power switch and adjust voltage to 115VAC/230VAC . Watch current meter for excess current draw. Current should not exceed 0.5A.
- 3.2 Check DC power supply at fuses. Should be approx. +34V (±1.5V)
- 3.4 Check DC voltage on mixer board. Should be approx. 15V(±0.5V)
- 3.5 Check 1/2 VCC on mixer board should be 8. VDC (± 0.5)
- 3.6 Measure DC voltages on IC of mixer & input PCB's, p8 15V (±5%), p4 0V (±100mV), p1 8V (± 5%) but on power it should be P8 18V (± 5%) other remain same.

3.7 Put a multimeter across R30 the meter should read 1.0mV (± 5%) then slowly adjust the preset R33 so that you get 3mV additional to the base reading.

3.8 Repeat 3.7 for R39 adjusting preset R34.

3.9 Un do step 3.1

3. AC Check :

- 4.1 Set signal generator to 1mV. Turn up Mic1 volume control to full. Watch for irregularities with output.
- 4.2 Set output to 35V using master volume control. Check voltage across Emitter resistors (on power devices)
- 4.3 Voltage should be between 150 – 200mV. Min and max values should be between 33% of the average value (i.e. min/max=0.5).
- 4.4 Turn master up to full. Check sensitivity of input. – MIC 1mV (± 10%) 22V in 4Ω load.

- 4.5 Check the output of all channels.
- 4.6 Measure 25V line 70V LINE, 8ohm (32Vac) tol.5%.
- 4.7 Check tape outputs (L and R) 250mV ($\pm 50\text{mV}$) (Measure on RCA socket).
- 4.8 Check line outputs. Approx. ($2.7\text{V} \pm 1.5\text{V}$).

5 Function Checks :

- 5.1 Check that you have the header link's on to
 - a) Vox muting enabled (Right Side).
 - b) VCA Con. Disabled (Back Side).
 - c) Vox relay enabled (Right Side).
- 5.2 Check speaker selector outputs, both individual and All Call (Check for the reverse action of the switches).
- 5.3 Keep signal in CH1 insert 'INSERT-PLUG' having external signal of different frequency the out put should cut off and switch over to applied insert signal, check signal on inset plugs ring terminal with respective ground should be 300mV. Remove insert plug .
- 5.4 Keep signal in CH1 short V/C terminals, out put should mute .
- 5.5 Check Phantom Switch for on/off operation. Measure Phantom voltage on an XLR inputs (should be 14.5VDC)
(Reset the phantom switch) (Phantom power on each XLR can be checked with the LED jig).
- 5.6 Switch off the set connect battery (24V) check for rated out put power (out put signal will clip up to 2%)

FINAL TESTING

Requirements for final testing :

- a. Load 40 Ω .
- b. Multimeter
- c. Oscilloscope
- d. Microphone
- e. Variac

6 Check sensitivity of all channel. (Optional)

- 6.1 Mic input (CH1-CH4) = 1mV out put =70V ($\pm 5\text{V}$)
- 6.2 AUX input (CH1-CH3)= 150mV out put =70V ($\pm 5\text{V}$)
- 6.3 AUX input (CH4) =150mV out put = 32.5V ($\pm 1.5\text{V}$)
- 6.4 Check the Power bandwidth – (68Hz $\pm 5\text{Hz}$ – 15KHz $\pm 2\text{KHz}$).
- 6.5 Check Bass control @ 100HZ = $\pm 12\text{dB}$ (TOL $\pm 1\text{dB}$) and treble @ 10kHz = $\pm 10\text{dB}$ (tol. $\pm 1\text{dB}$)
- 6.6 Check that input signal and output signal are in same phase by comparing CH 1 AUX Input and all other Outputs (25V, 70v, 4 Ω , 8 Ω)

7 Priority check : (optional)

- 7.1 Plug microphone into input 1 and oscillator to input 3. Check for muting of channel 3.
- 7.2 Plug microphone into input 2. Check for muting of channel 3.
- 7.3 Check 'mute disable' function. Insert Disable/Enable link (Factory set – ENABLE).
- 8 Check 4 tone switched inputs. Set output level of tones to approx. 14Vrms ($\pm 2\text{V}$) using evac tone. Check Page chime button for operation. Make sure channel 3 & 4 mutes with any of the tone's.
- 9 Check telephone input sensitivity for CH2 (US models only)
Tel input =150 mV out put =70V.
- 10 Increase the signal such that you get 76V & you can see the overload protection coming on with a kink

on the sine wave if it is there then reduce the voltage to 35V out and then short output. Release the shorting and check for the output.

- 11 Remove input signal and check for Hum & Noise (<20mVrms).
- 12 Reset volumes to minimum.
- 13 Disconnect from test bench and inspect for scratches on external paint.
- 14 Check the thermal cut off. It should be between (95 – 105 C). Allowable up to 115C. (If the sets show thermal trip above 115 then change (R49) to 3K9 or so).

14a Factory setting of links :

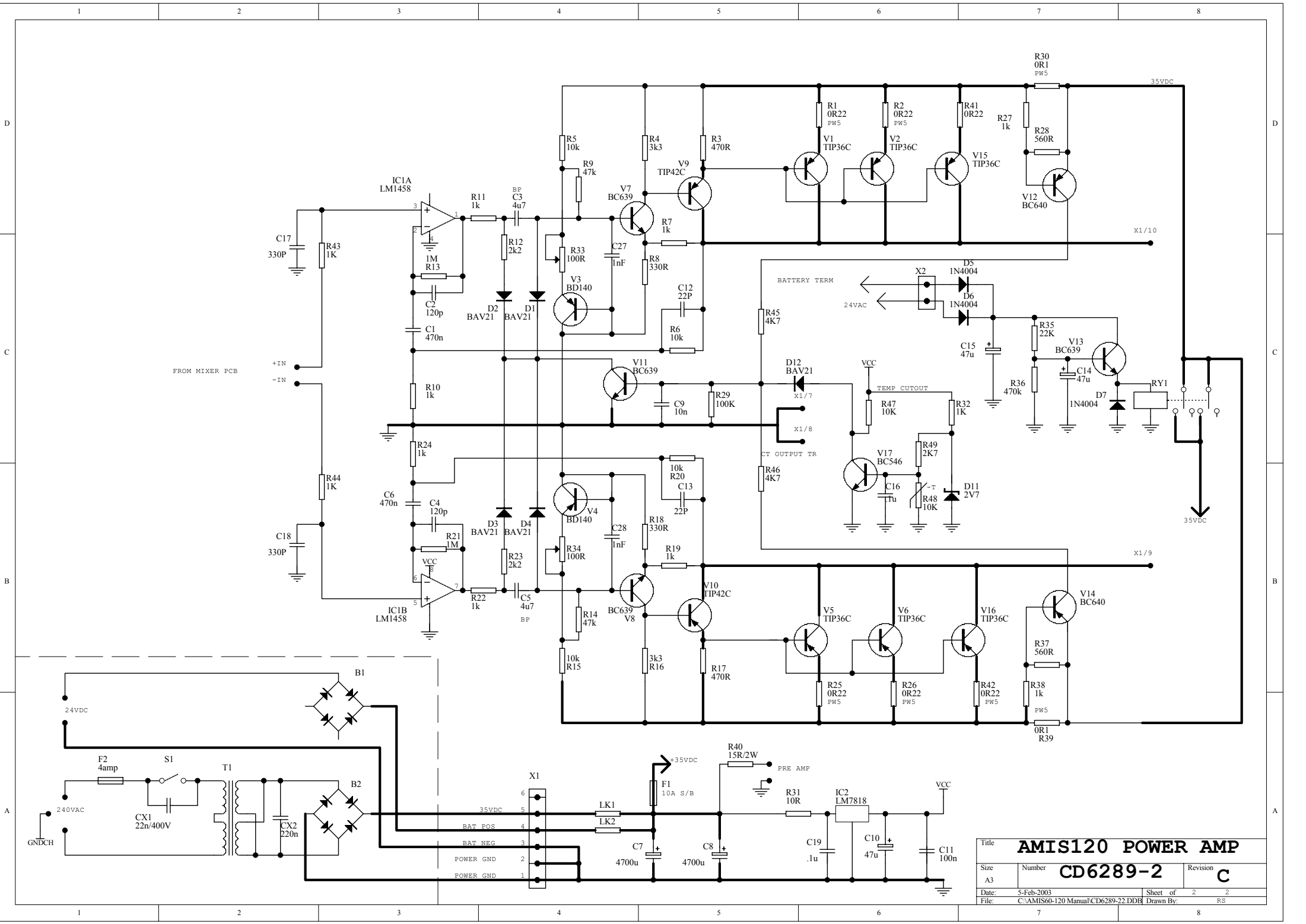
- a. VOX Muting : Enable
- b. VCA Con : Disable
- c. VOX Relay : Enable

LISTENING TEST

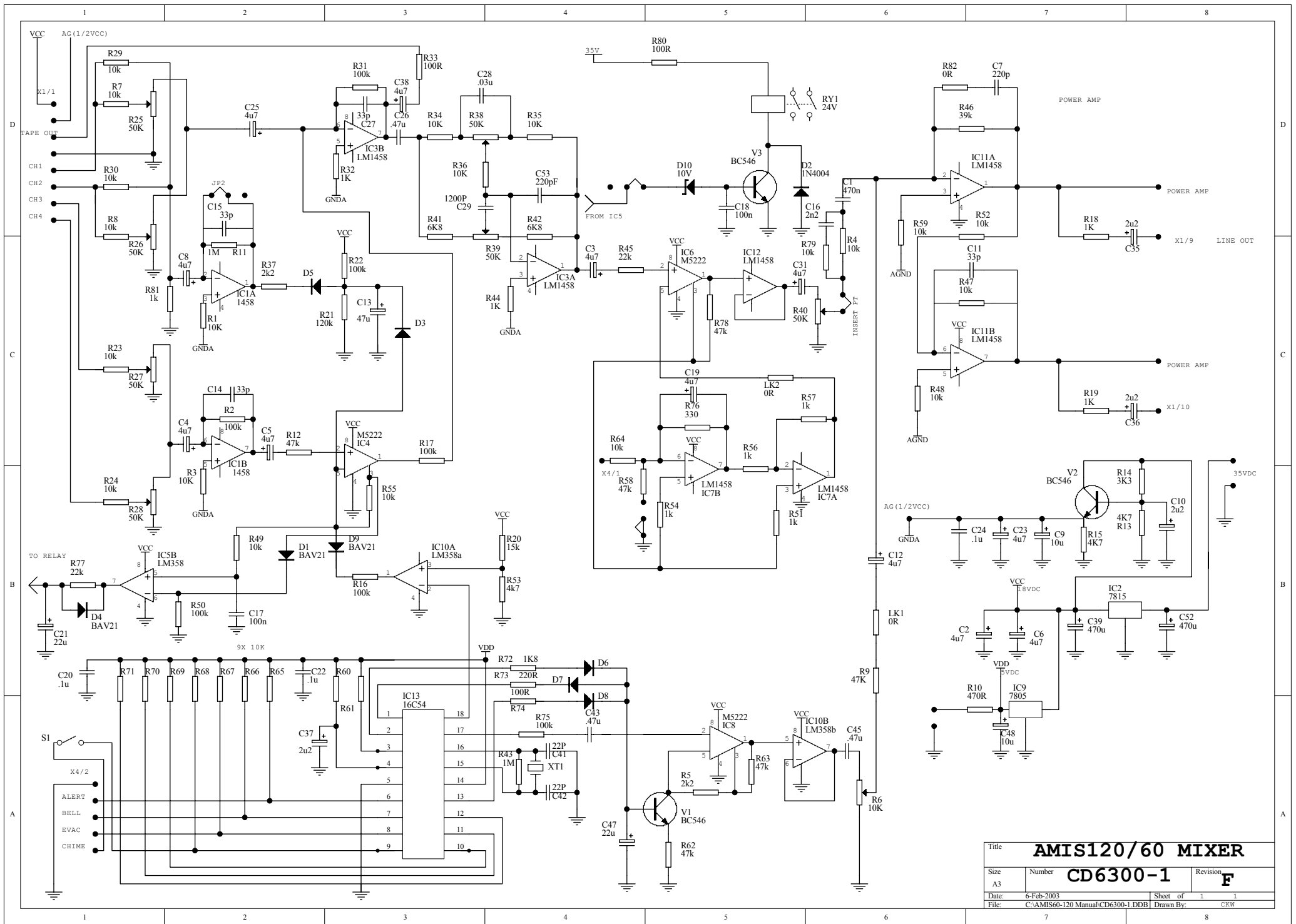
Requirements for Listening Test Setup :

- a. A CD Player
- b. Speaker
- c. Microphone

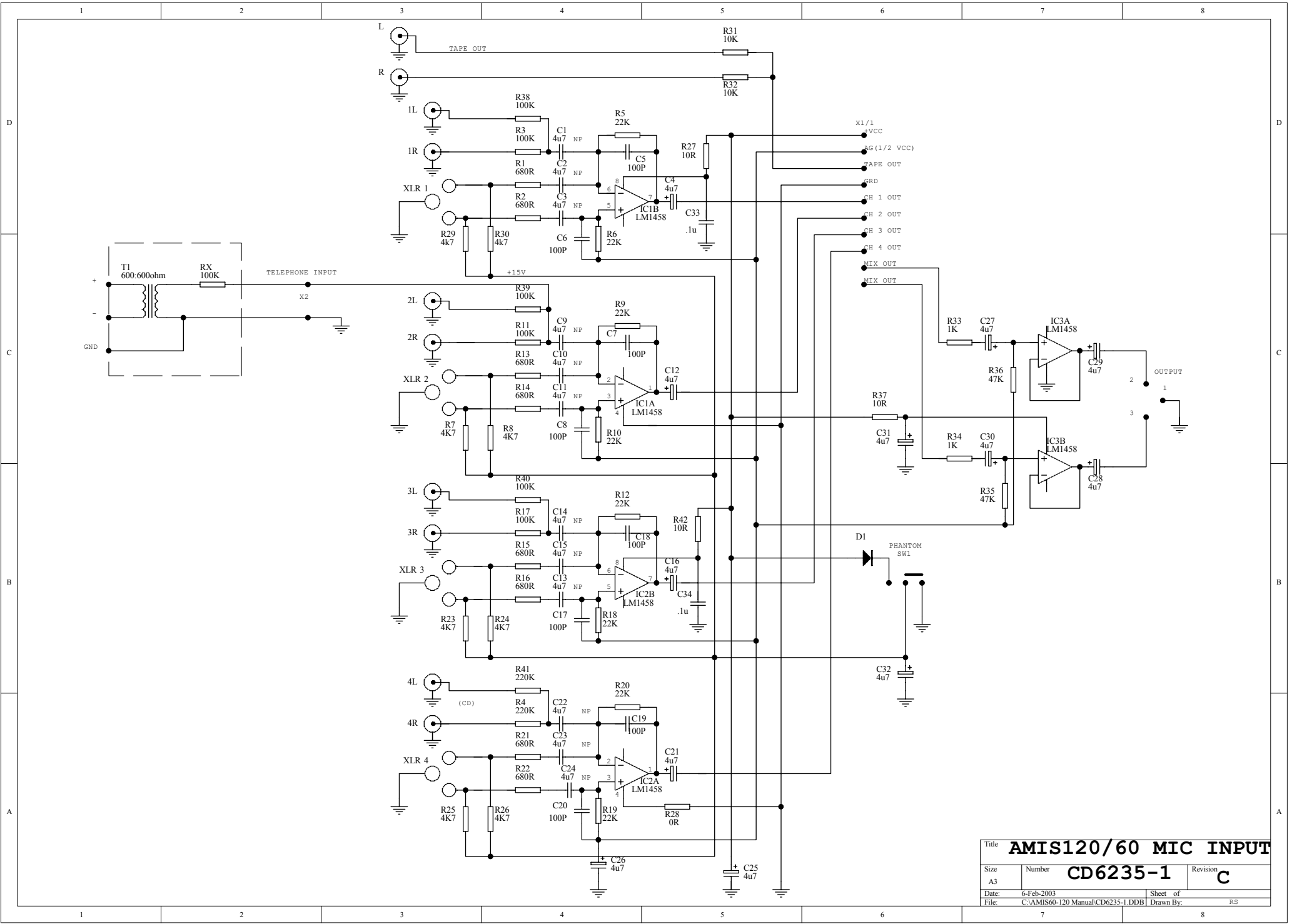
- 15 Connect amplifier to the signal source and the speaker
 - 15.1 Set all tone pots at center position, switch on the amplifier and check for any turn on thump.
 - 15.2 Connect the CD Player to an Auxiliary input (channel 4)
 - 15.3 Set all Channel Pots at the minimum (fully counter clockwise) position.
 - 15.4 Increase the level on the channel that has the program source connected and listen for audible problems.
 - 15.5 Check Priority function: CH 1 over CH 3 & 4, CH 2 over CH 3 & 4 by connecting a Microphone to Channel 1. An audio signal presented to the microphone should cause the CD player to muteCheck generated tones. With a jump wire, short one of the tone connections to the tone common connector (rear panel) and check to ensure that the tone selected activates



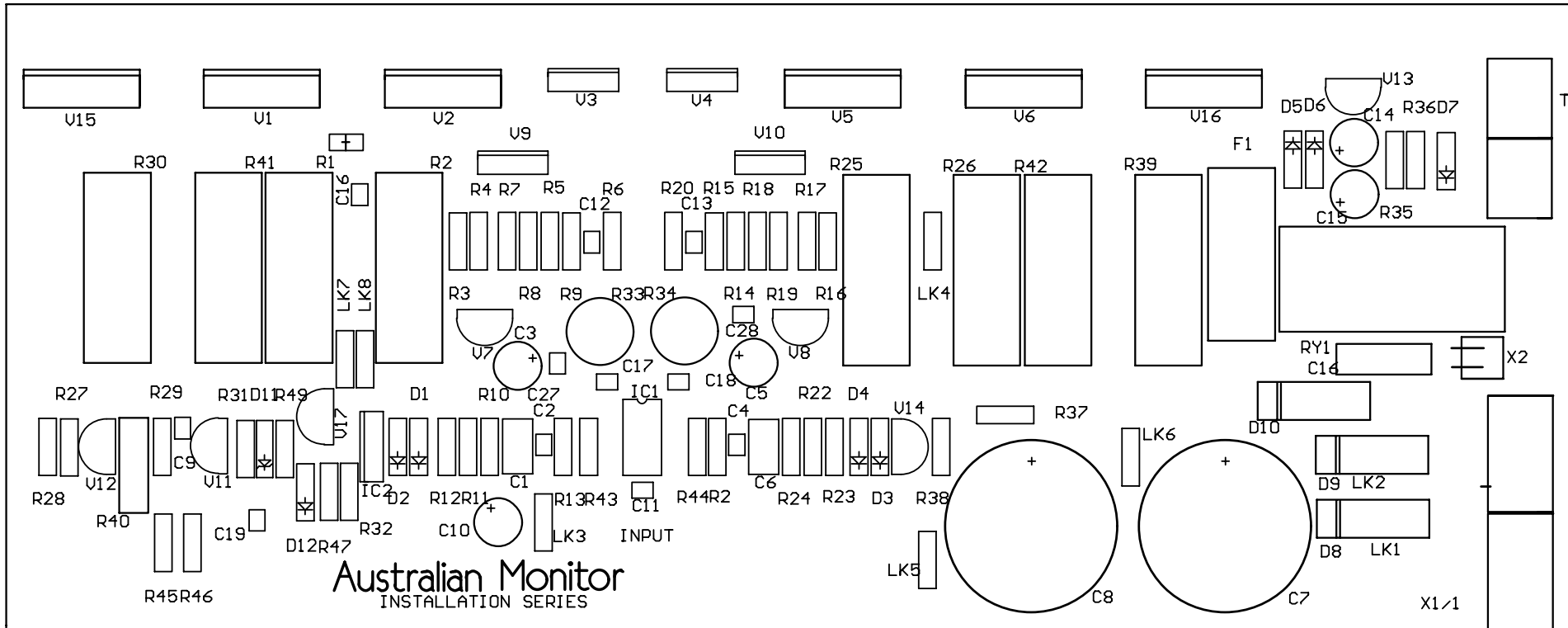
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Title AMIS120/60 MIXER		
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Date: 6-Feb-2003	Sheet of 1	1
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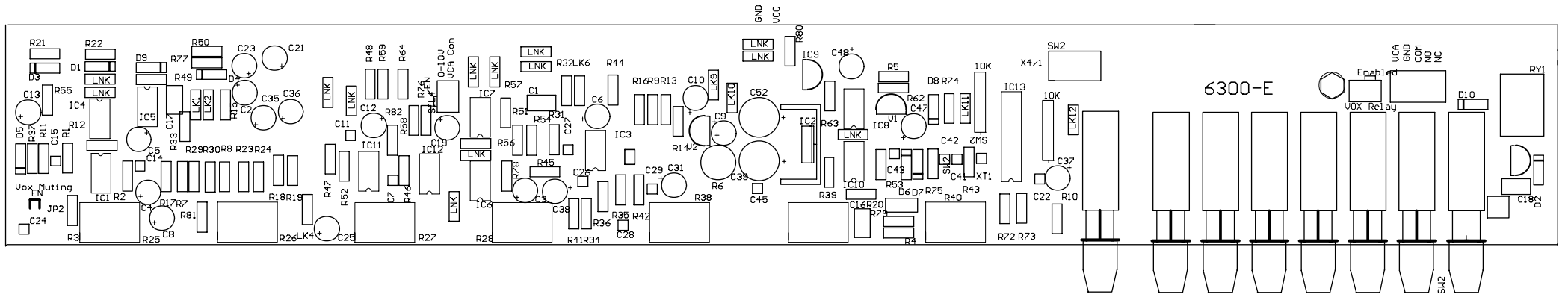
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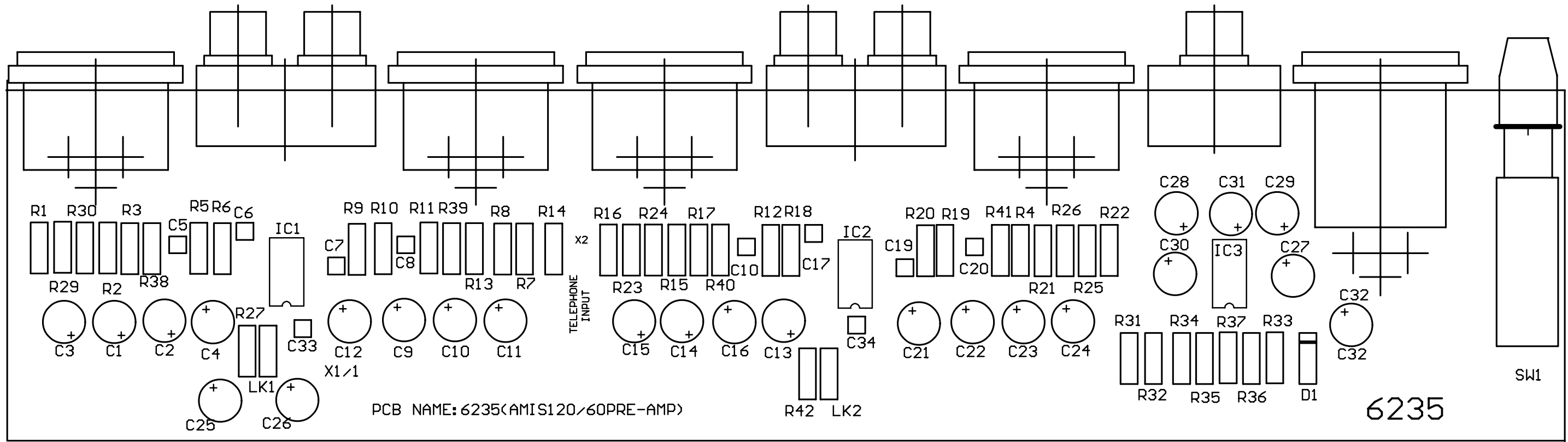


OUTPUT
TRANSFORMER
OUTPUT
GND-CT
GND-CT

24VAC
OR 35VDC
24VAC
+ BAT
GND-BAT
GND-CT
POWER TRANSFORMER
GND-CT

X1/1





UCC
1/2UCC
TAPE
GND
CH1
CH2
CH3
CH4
OUT
OUT

AMIS120 Power amplifier Component list				
Designator	Part Type	Description	Manufacture code	Order code
B1				
B2				
C1	470n	Metalised Polypropylene 63V	2125270477	
C10	47u	47uF electrolytic 35V	2121230470	
C11	100n	100n Metalised Polyester 100v	2124282101	
C12	22P	Multi layer ceramic 100V	2127181220	
C13	22P	Multi layer ceramic 100V	2127181220	
C14	47u	47uF electrolytic 35V	2121230470	
C15	47u	47uF electrolytic 35V	2121230470	
C16	.1u	Metalised Polypropylene 63V	2124282101	
C17	330P	Multi layer ceramic 100V	2127280336	
C18	330P	Multi layer ceramic 100V	2127280336	
C19	.1u	Metalised Polypropylene 63V	2124282101	
C2	120p	Multi layer ceramic 100V	2127180121	
C27	1nF	Metalised Polypropylene 63V	2124182100	
C28	1nF	Metalised Polypropylene 63V	2124182100	
C3	4u7	4.7uF NPE electrolytic 50V	2120250479	
C4	120p	Multi layer ceramic 100V	2127180121	
C5	4u7	4.7uF NPE electrolytic 50V	2120250479	
C6	470n	Metalised Polypropylene 63V	2125270477	
C7	4700u	4700uF electrolytic 40V	2121240472	
C8	4700u	4700uF electrolytic 40V	2121240472	
C9	10n	Metalised Polypropylene 63V	2124282101	
CX1	22n/400V	metalised Polypropylene 275V	2124192022	
CX2	220n	metalised Polypropylene 275v		
D1	BAV21	Small signal diode	2133400201	
D11	2V7	Diode, zener 1/2w 2V7	2136090279	
D12	BAV21	Small signal diode	2133400201	
D2	BAV21	Small signal diode	2133400201	
D3	BAV21	Small signal diode	2133400201	
D4	BAV21	Small signal diode	2133400201	
D5	1N4004	Rectifier Diode 400V/1A	2133440004	
D6	1N4004	Rectifier Diode 400V/1A	2133440004	
D7	1N4004	Rectifier Diode 400V/1A	2133440004	
F1				
F2	4amp			
IC1A	LM1458	I.C. Dual op-amp	2152810458	
IC1B	LM1458	I.C. Dual op-amp	2152810458	
IC2	LM7818	Regulator 18V To-220	2151378018	
LK1	0R	1/2 w Metal film resistor 0R	9111590000	
LK2	0R	1/2 w Metal film resistor 0R	9111590000	
R1	0R22	PW5 5W wire wound resistor	2111450228	PW5-R1
R10	1k	1/2 W Metal film resistor	9111590102	
R11	1k	1/2 W Metal film resistor	9111590102	
R12	2k2	1/2 W Metal film resistor	9111590222	
R13	1M	1/2 W Metal film resistor	9111590105	
R14	47k	1/2 W Metal film resistor	9111590473	
R15	10k	1/2 W Metal film resistor	9111590103	
R16	3k3	1/2 W Metal film resistor	9111590332	
R17	470R	1/2 W Metal film resistor	9111590471	
R18	330R	1/2 W Metal film resistor	9111590331	
R19	1k	1/2 W Metal film resistor	9111590102	
R2	0R22	PW5 5W wire wound resistor	2111450228	PW5-R22

R20	10k	1/2 W Metal film resistor	9111590103	
R21	1M	1/2 W Metal film resistor	9111590105	
R22	1k	1/2 W Metal film resistor	9111590102	
R23	2k2	1/2 W Metal film resistor	9111590222	
R24	1k	1/2 W Metal film resistor	9111590102	
R25	0R22	PW5 5W wire wound resistor	2111450228	
R26	0R22	PW5 5W wire wound resistor	2111450228	
R27	1k	1/2 W Metal film resistor	9111590102	
R28	560R	1/2 W Metal film resistor	9111590561	
R29	100K	1/2 W Metal film resistor	9111590104	
R3	470R	1/2 W Metal film resistor	9111590471	
R30	0R1	PW5 5W wire wound resistor	2111450108	PW5-R22
R31	10R	1/2 W Metal film resistor	9111590100	
R32	1K	1/2 W Metal film resistor	9111590102	
R33	100R	Cermet horizontal	2002211101	
R34	100R	Cermet horizontal	2002211101	
R35	22K	1/2 W Metal film resistor	9111590223	
R36	470k	1/2 W Metal film resistor	9111590474	
R37	560R	1/2 W Metal film resistor	9111560561	
R38	1k	1/2 W Metal film resistor	9111590102	
R39	0R1	PW5 5W wire wound resistor	2111450108	
R4	3k3	1/2 W Metal film resistor	9111590332	
R40	15R/2W	2 W Metal oxide resistor	2111220150	
R41	0R22	PW5 5W wire wound resistor	2111450228	PW5-R22
R42	0R22	PW5 5W wire wound resistor	2111450228	PW5-R22
R43	1K	1/2 W Metal film resistor	9111590102	
R44	1K	1/2 W Metal film resistor	9111590102	
R45	4K7	1/2 W Metal film resistor	9111590472	
R46	4K7	1/2 W Metal film resistor	9111590472	
R47	10K	1/2 W Metal film resistor	9111590103	
R48	10K	10k NTC thermistor	2111911103	
R49	2K7	1/2 W Metal film resistor	9111590272	
R5	10k	1/2 W Metal film resistor	9111590103	
R6	10k	1/2 W Metal film resistor	9111590103	
R7	1k	1/2 W Metal film resistor	9111590102	
R8	330R	1/2 W Metal film resistor	9111590331	
R9	47k	1/2 W Metal film resistor	9111590473	
RY1		Relay DPCO	2523220845	
S1		Rocker switch (round)	2511213112	
T1		Mains Transformer		X1104
V1	TIP36C	Transistor	2141600036	TIP36C
V10	TIP42C	Transistor	2141300042	TIP42C
V11	BC639	Transistor	2144200639	
V12	BC640	Transistor	2144200640	
V13	BC639	Transistor	2144200639	
V14	BC640	Transistor	2144200640	
V15	TIP36C	Transistor	2141600036	TIP36C
V16	TIP36C	Transistor	2141600036	TIP36C
V17	BC546	Transistor	2144200546	
V2	TIP36C	Transistor	2141600036	TIP36C
V3	BD140	Transistor	2141400140	
V4	BD140	Transistor	2141400140	
V5	TIP36C	Transistor	2141600036	TIP36C
V6	TIP36C	Transistor	2141600036	TIP36C
V7	BC639	Transistor	2144200639	
V8	BC639	Transistor	2144200639	

V9	TIP42C	Transistor	2141300042	TIP42C
X1	SIL6			
X2	SIL2			

AMIS120 Mixer Component List				
Designator	Part Type	Description	Manufacture code	Order Code
C1	470n	Metallised Poly 100V	2124262472	
C10	2u2	Electrolytic 63V	2121260229	
C11	33p	Multilayer Disc Ceramic	2127280336	
C12	4u7	Electrolytic 35V	2121230479	
C13	47u	Electrolytic 35V	2121230479	
C14	33p	Multilayer Disc Ceramic	2127280336	
C15	33p	Multilayer Disc Ceramic	2127280336	
C16	2n2	Multilayer Disc Ceramic	2127181221	
C17	100n	Metallised Poly 100V	2124282101	
C18	100n	Metallised Poly 100V	2124282101	
C19	4u7	Electrolytic 35V	2121230479	
C2	4u7	Electrolytic 35V	2121230479	
C20	.1u	Metallised Poly 100V	2124282101	
C21	22u	Electrolytic 35V	2121231220	
C22	.1u	Metallised Poly 100V	2124282101	
C23	4u7	Electrolytic 35V	2121230479	
C24	.1u	Metallised Poly 100V	2124282101	
C25	4u7	Electrolytic 35V	2121230479	
C26	.47u	Metallised Poly 100V	2124262472	
C27	33p	Multilayer Disc Ceramic	2127280336	
C28	.03u	Metallised Poly 100V	2124282330	
C29	1200P	Multilayer Disc Ceramic	2127181122	
C3	4u7	Electrolytic 35V	2121230479	
C31	4u7	Electrolytic 35V	2121230479	
C35	2u2	Electrolytic 63V	2121260229	
C36	2u2	Electrolytic 63V	2121260229	
C37	2u2	Electrolytic 63V	2121260229	
C38	4u7	Electrolytic 35V	2121230479	
C39	470u	Electrolytic 35V	2121230471	
C4	4u7	Electrolytic 35V	2121230479	
C41	22P	Multilayer Disc Ceramic	2127181220	
C42	22P	Multilayer Disc Ceramic	2127181220	
C43	.47u	Metallised Poly 100V	2124262472	
C45	.47u	Metallised Poly 100V	2124262472	
C47	22u	Electrolytic 35V	2121231220	
C48	10u	Electrolytic 35V	2121220100	
C5	4u7	Electrolytic 35V	2121230479	
C52	470u	Electrolytic 35V	2121230471	
C53	220pF	Multilayer Disc Ceramic	2127181221	
C6	4u7	Electrolytic 35V	2121230479	
C7	220p	Multilayer Disc Ceramic	2127181221	
C8	4u7	Electrolytic 35V	2121230479	
C9	10u	Electrolytic 35V	2121220100	
D1	BAV21	Signal Diode	2133400201	
D10	10V	Zener Diode 10V	2133440004	
D2	1N4004	Rectifier Diode 1A 400V	2133440004	
D3		Signal Diode	2133400201	
D4	BAV21	Signal Diode	2133400201	
D5		Signal Diode	2133400201	
D6		Signal Diode	2133400201	
D7		Signal Diode	2133400201	
D8		Signal Diode	2133400201	
D9	BAV21	Signal Diode	2133400201	

IC10A	LM358a	Dual op-amp DIP 8 pin	2152800358
IC10B	LM358b	Dual op-amp DIP 8 pin	2152800358
IC11A	LM1458	Dual op-amp DIP 8 pin	2152810458
IC11B	LM1458	Dual op-amp DIP 8 pin	2152810458
IC12	LM1458	Dual op-amp DIP 8 pin	2152810458
IC13	16C54	PIC 16C54-XT/P DIP 18 PIN	2159601654
IC1A	1458	Dual op-amp DIP 8 pin	2152810458
IC1B	1458	Dual op-amp DIP 8 pin	2152810458
IC2	7815	Regulator TO220	2151370818
IC3A	LM1458	Dual op-amp DIP 8 pin	2152810458
IC3B	LM1458	Dual op-amp DIP 8 pin	2152810458
IC4	M5222	VCA	2153850222
IC5B	LM358	Dual op-amp DIP 8 pin	2152800358
IC6	M5222	VCA	2153850222
IC7A	LM1458	Dual op-amp DIP 8 pin	2152810458
IC7B	LM1458	Dual op-amp DIP 8 pin	2152810458
IC8	M5222	VCA	2153850222
IC9	7805	Regulator TO92	2151370805
LK1	0R	1/2W Metal film resistor	9111590000
LK2	0R	1/2W Metal film resistor	9111590000
R1	10K	1/2W Metal film resistor	9111590103
R10	470R	1/2W Metal film resistor	9111590471
R11	1M	1/2W Metal film resistor	9111590105
R12	47k	1/2W Metal film resistor	9111590473
R13	4K7	1/2W Metal film resistor	9111590472
R14	3K3	1/2W Metal film resistor	9111590332
R15	4K7	1/2W Metal film resistor	9111590473
R16	100k	1/2W Metal film resistor	9111590104
R17	100k	1/2W Metal film resistor	9111590104
R18	1K	1/2W Metal film resistor	9111590102
R19	1K	1/2W Metal film resistor	9111590102
R2	100k	1/2W Metal film resistor	9111590104
R20	15k	1/2W Metal film resistor	9111590153
R21	120k	1/2W Metal film resistor	9111590124
R22	100k	1/2W Metal film resistor	9111590104
R23	10k	1/2W Metal film resistor	9111590103
R24	10k	1/2W Metal film resistor	9111590103
R25	50K	Potentiometer 50KB	2021000503
R26	50K	Potentiometer 50KB	2021000503
R27	50K	Potentiometer 50KB	2021000503
R28	50K	Potentiometer 50KB	2021000503
R29	10k	1/2W Metal film resistor	9111590103
R3	10K	1/2W Metal film resistor	9111590103
R30	10k	1/2W Metal film resistor	9111590103
R31	100k	1/2W Metal film resistor	9111590104
R32	1K	1/2W Metal film resistor	9111590102
R33	100R	1/2W Metal film resistor	9111590101
R34	10K	1/2W Metal film resistor	9111590103
R35	10K	1/2W Metal film resistor	9111590103
R36	10K	1/2W Metal film resistor	9111590103
R37	2k2	1/2W Metal film resistor	9111590222
R38	50K	Potentiometer 50KB	2021000503
R39	50K	Potentiometer 50KB	2021000503
R4	10k	1/2W Metal film resistor	9111590103
R40	50K	Potentiometer 50KB	2021000503
R41	6K8	1/2W Metal film resistor	9111590682

R42	6K8	1/2W Metal film resistor	9111590682
R43	1M	1/2W Metal film resistor	9111590105
R44	1K	1/2W Metal film resistor	9111590102
R45	22k	1/2W Metal film resistor	9111590223
R46	39k	1/2W Metal film resistor	9111590393
R47	10k	1/2W Metal film resistor	9111590103
R48	10k	1/2W Metal film resistor	9111590103
R49	10k	1/2W Metal film resistor	9111590103
R5	2k2	1/2W Metal film resistor	9111590222
R50	100k	1/2W Metal film resistor	9111590104
R51	1k	1/2W Metal film resistor	9111590102
R52	10k	1/2W Metal film resistor	9111590103
R53	4k7	1/2W Metal film resistor	9111590472
R54	1k	1/2W Metal film resistor	9111590102
R55	10k	1/2W Metal film resistor	9111590103
R56	1k	1/2W Metal film resistor	9111590102
R57	1k	1/2W Metal film resistor	9111590102
R58	47k	1/2W Metal film resistor	9111590473
R59	10k	1/2W Metal film resistor	9111590103
R6	10K	10k Cermet potentiometer	9111590103
R60	0r	1/2W Metal film resistor	9111590000
R61	0r	1/2W Metal film resistor	9111590000
R62	47k	1/2W Metal film resistor	9111590473
R63	47k	1/2W Metal film resistor	9111590473
R64	10k	1/2W Metal film resistor	9111590103
R65		Resistor pack 1K ohms	2111886102
R66		Resistor pack 1K ohms	2111886102
R67		Resistor pack 1K ohms	2111886102
R68		Resistor pack 1K ohms	2111886102
R69		Resistor pack 1K ohms	2111886102
R7	10k	1/2W Metal film resistor	9111590103
R70		Resistor pack 1K ohms	2111886102
R71		Resistor pack 1K ohms	2111886102
R72	1K8	1/2W Metal film resistor	9111590182
R73	220R	1/2W Metal film resistor	9111590221
R74	100R	1/2W Metal film resistor	9111590101
R75	100k	1/2W Metal film resistor	9111590104
R76	330	1/2W Metal film resistor	9111590331
R77	22k	1/2W Metal film resistor	9111590223
R78	47k	1/2W Metal film resistor	9111590473
R79	10k	1/2W Metal film resistor	9111590103
R8	10k	1/2W Metal film resistor	9111590103
R80	100R	1/2W Metal film resistor	9111590101
R81	1k	1/2W Metal film resistor	9111590102
R82	0R	1/2W Metal film resistor	9111590000
R9	47K	1/2W Metal film resistor	9111590473
RY1	24V	Relay 1P c/o	2522240842
S1			
V1	BC546	Transistor TO92	2144200546
V2	BC546	Transistor TO92	2144200546
V3	BC546	Transistor TO92	2144200546
XT1		Resonator 4mHz	2171400000

AMIS120 Input Component List			
Designator	Part Type	Description	Part number
1	XLR	XLR connector, female	2587210266
2	XLR	XLR connector, female	2587210266
3	XLR	XLR connector, female	2587210266
4	XLR	XLR connector, female	2587210266
1L	RCA	RCA Socket	2581420102
1R	RCA	RCA Socket	2581420102
2L	RCA	RCA Socket	2581420102
2R	RCA	RCA Socket	2581420102
3L	RCA	RCA Socket	2581420102
3R	RCA	RCA Socket	2581420102
4L	RCA	RCA Socket	2581420102
4R	RCA	RCA Socket	2581420102
C1	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C10	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C11	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C12	4u7	Electrolytic 35V	2121230479
C13	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C14	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C15	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C16	4u7	Electrolytic 35V	2121230479
C17	100P	Multi Layer Ceramic 100V	2127181101
C18	100P	Multi Layer Ceramic 100V	2127181101
C19	100P	Multi Layer Ceramic 100V	2127181101
C2	4u7	Electrolytic 35V	2121230479
C20	100P	Multi Layer Ceramic 100V	2127181101
C21	4u7	Electrolytic 35V	2121230479
C22	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C23	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C24	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C25	4u7	Electrolytic 35V	2121230479
C26	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C27	4u7	Electrolytic 35V	2121230479
C28	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C29	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C3	4u7(NP)	Non Polar Electrolytic 50V	2120250479
C30	4u7	Electrolytic 35V	2121230479
C31	4u7	Electrolytic 35V	2121230479
C32	4u7	Electrolytic 35V	2121230479
C33	.1u	Metalised Poly	2124282101
C34	.1u	Metalised Poly	2124282101
C4	4u7	Electrolytic 35V	2121230479
C5	100P	Multi Layer Ceramic 100V	2127181101
C6	100P	Multi Layer Ceramic 100V	2127181101
C7	100P	Multi Layer Ceramic 100V	2127181101
C8	100P	Multi Layer Ceramic 100V	2127181101
C9	4u7	Electrolytic 35V	2121230479
D1	1N4004	1A 400V	2133440004
IC1A	LM1458	Dual op-amp DIP 8 Pin	2152810458
IC1B	LM1458	Dual op-amp DIP 8 Pin	2152810458
IC2A	LM1458	Dual op-amp DIP 8 Pin	2152810458
IC2B	LM1458	Dual op-amp DIP 8 Pin	2152810458
IC3A	LM1458	Dual op-amp DIP 8 Pin	2152810458
IC3B	LM1458	Dual op-amp DIP 8 Pin	2152810458

L	RCA	RCA Socket	2581420102
R	RCA	RCA Socket	2581420102
R1	680R	1/2watt Metal film resistor	9111590681
R10	22K	1/2watt Metal film resistor	9111590223
R11	100K	1/2watt Metal film resistor	9111590104
R12	22K	1/2watt Metal film resistor	9111590223
R13	680R	1/2watt Metal film resistor	9111590681
R14	680R	1/2watt Metal film resistor	9111590681
R15	680R	1/2watt Metal film resistor	9111590681
R16	680R	1/2watt Metal film resistor	9111590681
R17	100K	1/2watt Metal film resistor	9111590104
R18	22K	1/2watt Metal film resistor	9111590223
R19	22K	1/2watt Metal film resistor	9111590223
R2	680R	1/2watt Metal film resistor	9111590681
R20	22K	1/2watt Metal film resistor	9111590223
R21	680R	1/2watt Metal film resistor	9111590681
R22	680R	1/2watt Metal film resistor	9111590681
R23	4K7	1/2watt Metal film resistor	9111590472
R24	4K7	1/2watt Metal film resistor	9111590472
R25	4K7	1/2watt Metal film resistor	9111590472
R26	4K7	1/2watt Metal film resistor	9111590472
R27	10R	1/2watt Metal film resistor	9111590100
R28	0R	1/2watt Metal film resistor	9111590000
R29	4k7	1/2watt Metal film resistor	9111590472
R3	100K	1/2watt Metal film resistor	9111590104
R30	4k7	1/2watt Metal film resistor	9111590472
R31	10K	1/2watt Metal film resistor	9111590103
R32	10K	1/2watt Metal film resistor	9111590000
R33	1K	1/2watt Metal film resistor	9111590102
R34	1K	1/2watt Metal film resistor	9111590102
R35	47K	1/2watt Metal film resistor	9111590473
R36	47K	1/2watt Metal film resistor	9111590473
R37	10R	1/2watt Metal film resistor	9111590100
R38	100K	1/2watt Metal film resistor	9111590104
R39	100K	1/2watt Metal film resistor	9111590104
R4	220K	1/2watt Metal film resistor	9111590224
R40	100K	1/2watt Metal film resistor	9111590104
R41	220K	1/2watt Metal film resistor	9111590224
R42	10R	1/2watt Metal film resistor	9111590100
R5	22K	1/2watt Metal film resistor	9111590223
R6	22K	1/2watt Metal film resistor	9111590223
R7	4K7	1/2watt Metal film resistor	9111590472
R8	4K7	1/2watt Metal film resistor	9111590472
R9	22K	1/2watt Metal film resistor	9111590223
RX	100K	1/2watt Metal film resistor	9111590104
T1	600:600r	Optional transformer U.S.A	9651280253
	XLR	XLR connector, male	2587110227

AMIS120-60 Parts price list				
Part	Description	Manufacturer code	In house	AUD\$
<u>PCB's</u>				
120 Mixer	Mixer PCB	S5728MAMIS120S16		\$43.38
120 Input pcb	Input PCB	S5728MAMIS120S17		\$16.03
120 Output PCB	Output PCB	S5728MAMIS120S18		\$71.48
LED	Display PCB	S5728MAMIS120S19		\$5.13
60 Mixer	Mixer PCB	S5728MAMIS60S16		\$43.38
60 Input pcb	Input PCB	S5728MAMIS60S17		\$16.03
60 Output PCB	Output PCB	S5728MAMIS60S18		\$71.48
LED	Display PCB	S5728MAMIS120S19		\$5.13
<u>Transformers</u>				
AMIS120	Mains 230/240V	5728MAN120PS04		\$30.34
AMIS60	Mains 230/240V	5728MAN60PS04		\$23.72
AMIS120	Output	S5728MAN120PS22		\$25.44
AMIS60	Output	S5728MAN60PS22		\$25.44
<u>Semiconductors</u>				
TIP36C	PNP TO3P transistor	2141600036	TIP36C	\$3.60
TIP42C	PNP TO220 transistor	2141300042	TIP42C	\$2.01
BC639	NPN TO92	2144200639	S7007	\$0.16
BC640	PNP TO92	2144200640	S7008	\$0.16
BD140	PNP TO92	2141400140		\$0.22
BD139	NPN TO92	2141400139	S7009	\$0.22
LM1458	IC Dual Op amp	2152801048	LM1458	\$0.27
LM833N	IC Dual Op amp	2157800833	LM833	\$1.05
LM358	IC Dual Op amp	2152800358	LM358	\$1.05
LM78L05	IC Regulator	2151270805	LM7805	\$0.17
LM7815	IC Regulator	2151370815	LM7815	\$0.52
LM7818	IC Regulator	2151370818	LM7818	\$0.52
PIC16C54-XTP	Program IC	2159601654	120PIC	\$4.17
LM5222	IC VCA	2153850222		\$1.56
10k Thermistor		2111911103		\$0.80
<u>Switches & Pots</u>				
Volume Pot	channel & master	2021000503		\$0.61
Power switch	Round rocker switch	2511213112		\$1.39

Hardware				
Front Panel 120		S600000136		\$3.69
Front Panel 60		S600000139		\$3.69
Lid		S600000134		\$11.36
Rack ears		S600000137		\$4.35
Chassis 120		S600000133		\$12.28
Chassis 60		S600000133		\$12.28
Barrier Strip 12		2583528312		\$3.92
Phono connector	1/4" socket	2582110645		\$0.86
XLRF		2587210266		1.34
XLMR		2587110227		1.08
Screw + washer	Black screw w/star	2316420308		0.08
Screw	Black screw wo/star	2316421306		0.08
Knob	volume & master	9346110015		0.12
Acrylic cover for 12 way terminal		9347560012		0.31