CMRR/SYMMETRY TRIMMING JIG

ASSEMBLY and INSTRUCTIONS MANUAL

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This manual is not meant to be a step by step guide for the assembly. However, the components are packed and numbered in the correct order. The numbers correspond to the bill of materials. Open them one at a time. Do not open the next package before completing the assembly of the previous one. There is a reason behind each stage.

Populating a PCB always starts with the smallest components. Resistors and/or small signal diodes being the first. If you solder the larger components first you'll have a hard time in soldering the resistors or the small signal diodes. Before soldering a component visually check its value and designation. Although normally it is not required, testing them would also be a good practice (excluding integrated circuits) before they go on the board.

A good quality soldering iron with a fine tip and a set of hand tools are a must. Plumber's torch does not have a place in electronics assembly and component leads are not trimmed using a Black Smith's pliers. A miniature close cutting side cutter will have to be a part of your tool kit. Equally fixing an M2 screw will not be possible with a screw driver normally used for M10 bolt. A simple spring action desoldering pump will do fine for single sided boards. But for double sided/plated through boards such as this a proper (electric motor pump action) de-soldering tool will be essential. However, you do not have to get the ones that require re-mortgaging your house. There are affordable ones that will also do a good job.

Most faults will arise due to incorrect components being inserted or solder bridges. It is particularly important to closely examine the soldering of components with close pads such as transistors. Therefore, unless you have eagle eyes, checking each solder node with a hand held or table mount magnifier as you go along will be an extremely good practice.

Do not stay on the components with the soldering iron for too long as there can be a possibility of causing damage. You should be able to get in and out of a solder node within a couple of seconds.

Safety first, Be extremely careful when trimming component leads as these can easily fly off into your face. Always hold the lead with one hand while trimming it with the other. In general do not rush. Work methodically and have fun.

BASIC INFO ON CMRR and SYMMETRY

CMRR (COMMON MODE REJECTION RATIO):

The common-mode rejection ratio (CMRR) of the preamplifier is the rejection by the device of unwanted input signals common to both input leads, relative to the wanted difference signal.

In a microphone preamplifier the ideal CMRR of infinity is degraded by component tolerances and layout

The most significant factor at low frequencies is the value of the series input capacitors.

The most significant factor at high frequencies is stray capacitance and capacitive tolerances.

For best rejection performance the capacitors on each input leg should be the same.

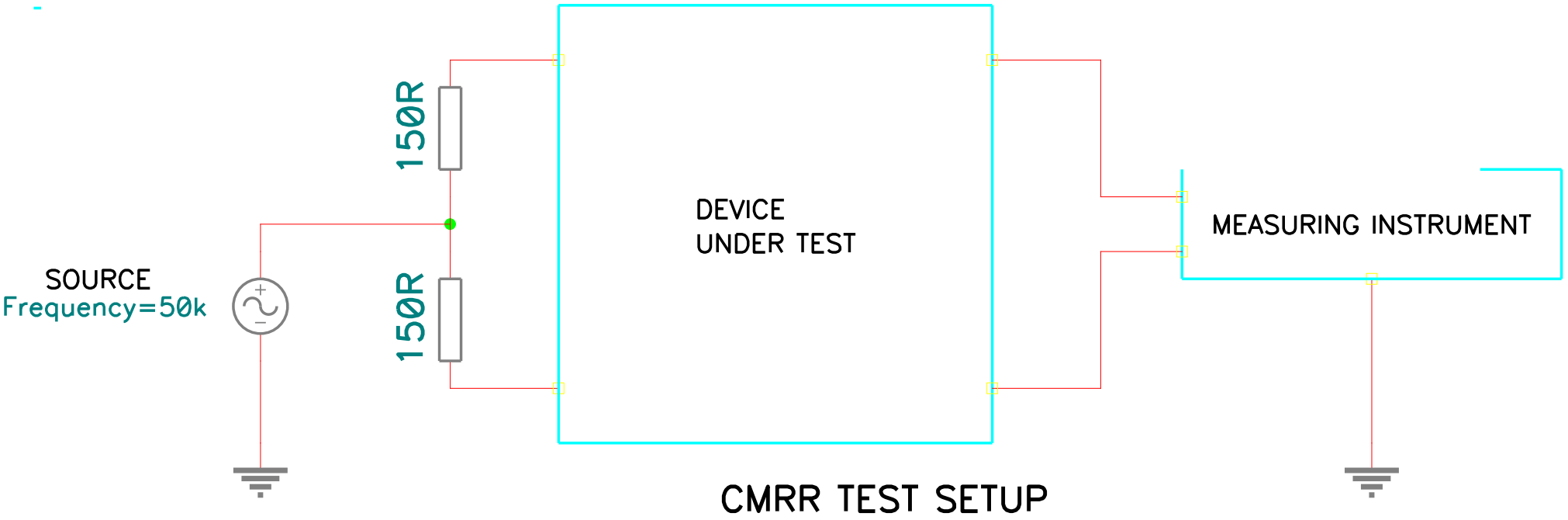
The CMRR obtainable is dependent on the source impedance and any imbalance between components in the HI and LO signal paths. CMRR worsens with increasing source impedance.

The CMRR adjustment trimmer compensates for the stray capacitance by adjusting the value in one leg of the input to match a fixed value in the other. If identical capacitance is present on each leg of the input the trimming may be unnecessary.

Trimming CMRR with the signal generator connected directly to the microphone amplifier does not take into account any distributed cable capacitance, so connection of a cable to the rack input XLR will alter the results obtained.

The CMRR test uses a precision 150R resistor in each input leg.

CMRR trimming should take place at 50 kHz, or not less than 20 kHz.



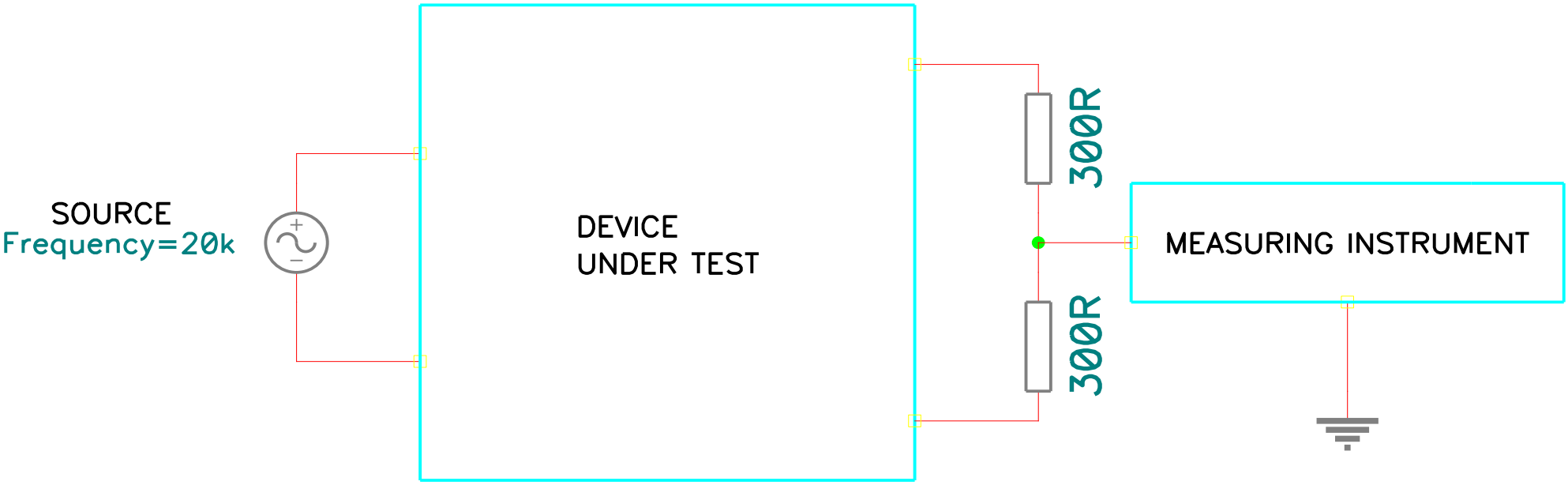
CMRR TEST SETUP

SYMMETRY:

The symmetry of a device is a measure of the difference between the two phases of a balanced signal. This has a direct effect on how much the device can suppress common-mode signals at its output.

Symmetry is measured at the junction of two closely matched 300R resistors (600R load).

A recommended test frequency is between 10kHz and 50kHz (to take capacitive effects into account).



OUTPUT SYMMETRY TEST SETUP

CMRR / SYMMETRY TRIMMING JIG

PREAMBLE

The CMRR/SYMMETRY JIG is for carrying out tests using unbalanced test equipment.

The signal source may be from a signal generator or computer. A sine wave signal is recommended.

The measuring instrument could be a DVM, level meter, AC/Audio voltmeter, oscilloscope or computer.

If a DVM is to be used it must be capable of measuring high frequency low level signals.

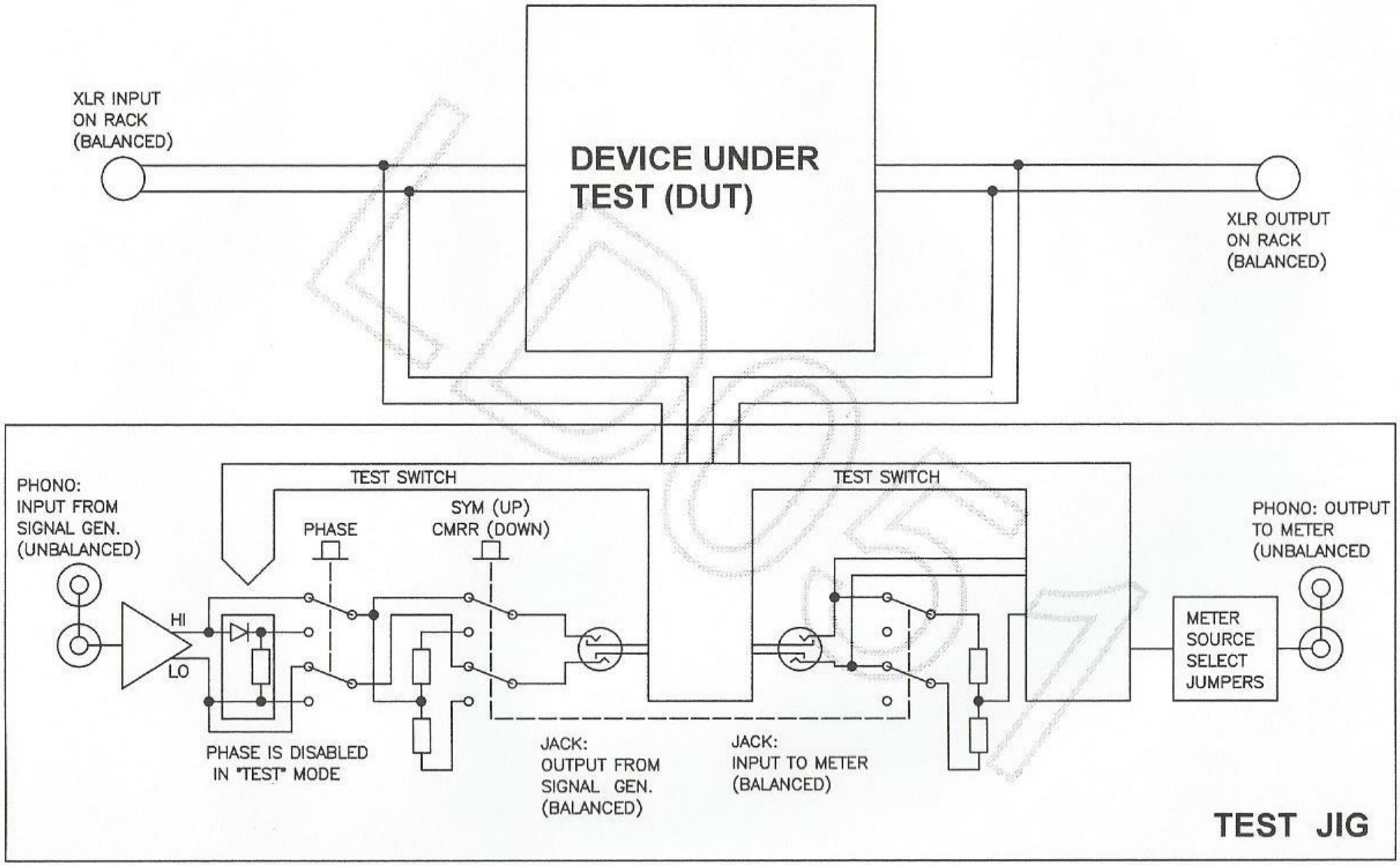
If a computer is to be used it is recommended to use software from True Audio or similar.

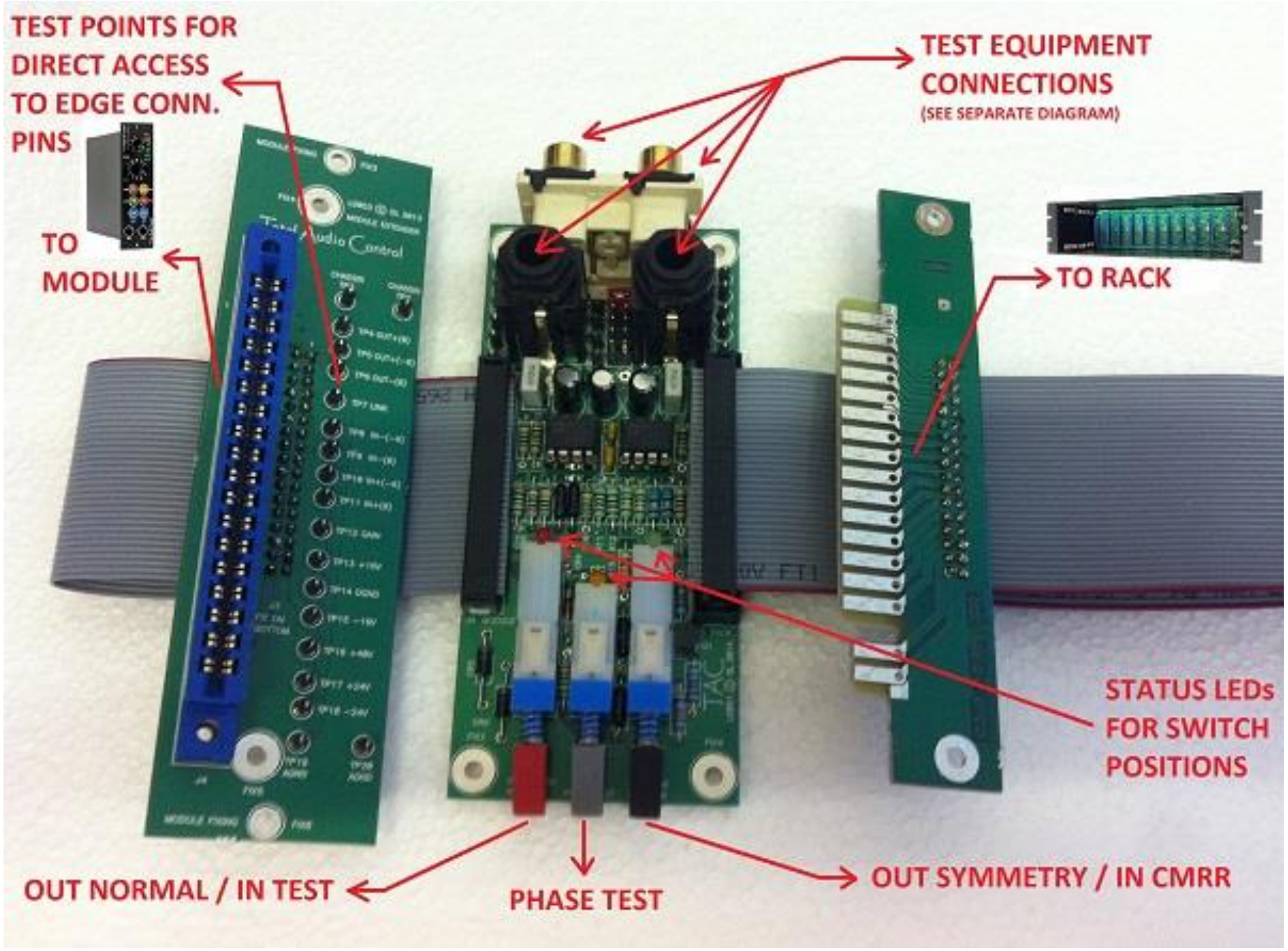
http://www.trueaudio.com/rta_abt1.htm - the free version is sufficient to carry out the tests.

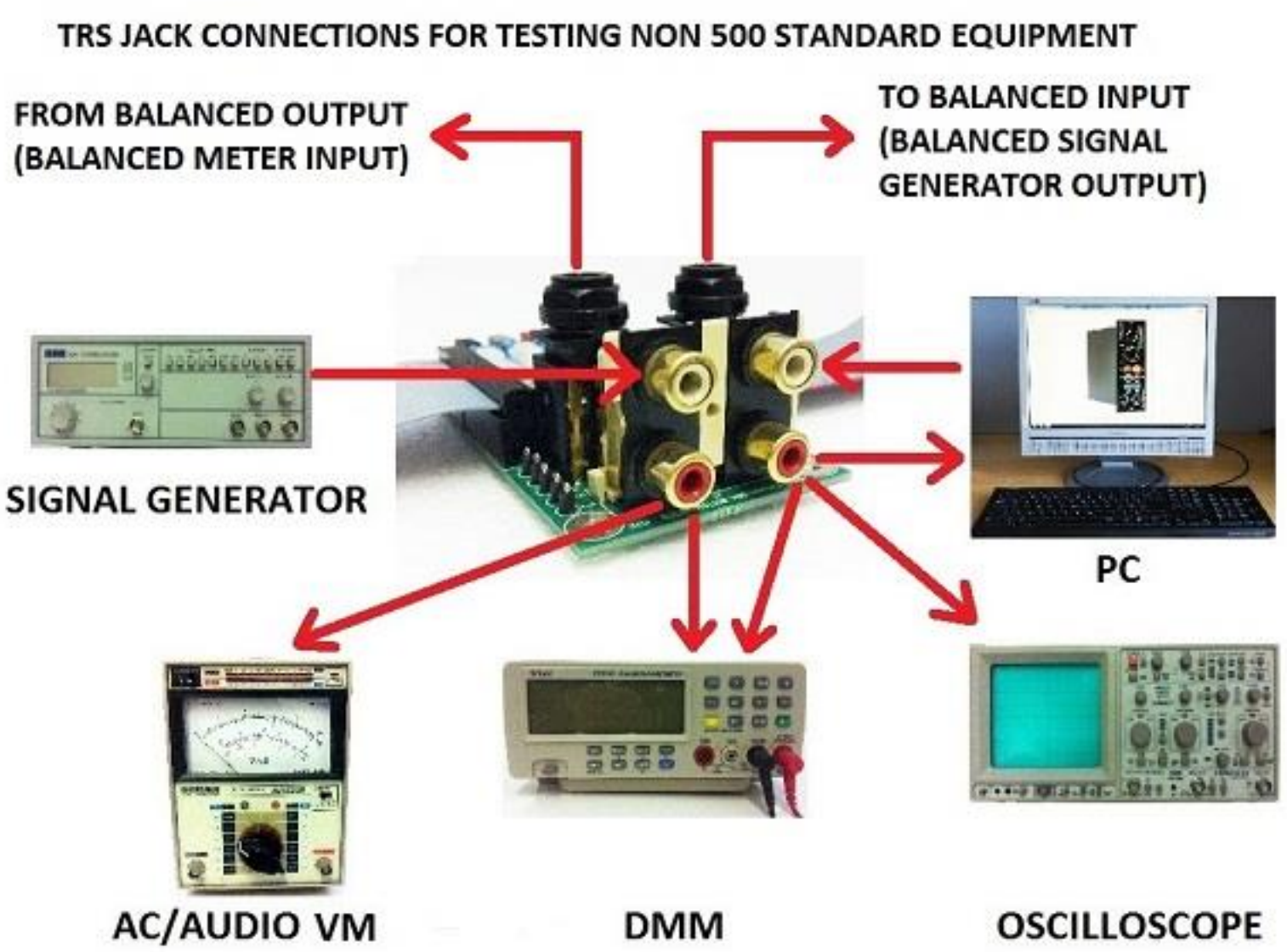
The inputs and outputs of the module under test remain connected to the rear connectors when the jig is inserted in the extender lead. It is highly recommended that all connections are disconnected from the rack that relate to the module position under test. This includes multiway connections. This will eliminate the effects of loading by cable or external equipment.

There are special cases where these connections may be made and these are discussed later in the text.

The jig places a load of 600 ohms on the module output. This is the normal load applied when testing professional audio equipment because it can create worst case output swing and THD conditions.


XLR INPUT
ON RACK
(BALANCED)
DEVICE UNDER
TEST (DUT)
XLR OUTPUT
ON RACK
(BALANCED)
PHONO:
INPUT FROM
SIGNAL GEN.
(UNBALANCED)
TEST SWITCH
PHASE
SYM (UP)
CMRR (DOWN)
TEST SWITCH
PHONO: OUTPUT
TO METER
(UNBALANCED
HI
LO
METER
SOURCE
SELECT
JUMPERS
PHASE IS DISABLED
IN "TEST" MODE
JACK:
OUTPUT FROM
SIGNAL GEN.
(BALANCED)
JACK:
INPUT TO METER
(BALANCED)
TEST JIG


TEST POINTS FOR
DIRECT ACCESS
TO EDGE CONN.
PINS
TO
MODULE
TEST EQUIPMENT
CONNECTIONS
(SEE SEPARATE DIAGRAM)
TO RACK
STATUS LEDs
FOR SWITCH
POSITIONS
OUT NORMAL / IN TEST
PHASE TEST
OUT SYMMETRY / IN CMRR



Top two and bottom two phono connectors are connected in parallel and form a pair.

ASSEMBLY

- The CMRR/SYMMETRY JIG consists of two main parts. The CMRR/SYMMETRY CARD and MODULE EXTENDER

- The MODULE EXTENDER consists of two main parts. The EDGE CONNECTOR CARD and FINGER CARD.

- The CMRR/SYMMETRY CARD is inserted between the EDGE CONNECTOR CARD and FINGER CARD.

- The MODULE EXTENDER can also be used stand alone for hooking up and basic tests of 500 standard modules.

CMRR & SYMMETRY CARD BILL OF MATERIALS

Count	Component Name	Design.	Supplier Part No.	Notes
1	PCB	LD051	TAC	
1	1N4148	CR4	RAPID 47-3416	
2	1N4003	CR5	RAPID 47-3134	
	1N4003	CR6		
2	5.6R	R15		
		R16		
3	47R	R13		
		R14		
		R18		
1	100R	R24		
2	150R / 0.1%	R20	RAPID 63-1060	
		R22		
2	300R / 0.1%	R8	RAPID 63-1132	(330R)
		R9		
2	1K	R1		
		R21		

2	4.7K	R11 R12	
1	6.8K	R19	
4	20K	R2 R3 R5 R6	
2	47K	R17 R4	
2	100K	R7 R10	
1	120K	R23	
13	TESTPOINT	TP1 to 13	RAPID 17-1810
5	2WAY PIN HEADER	P1 to 5	RAPID 22-0520
1	2WAY PIN HEADER JUMPER		RAPID 22-3585

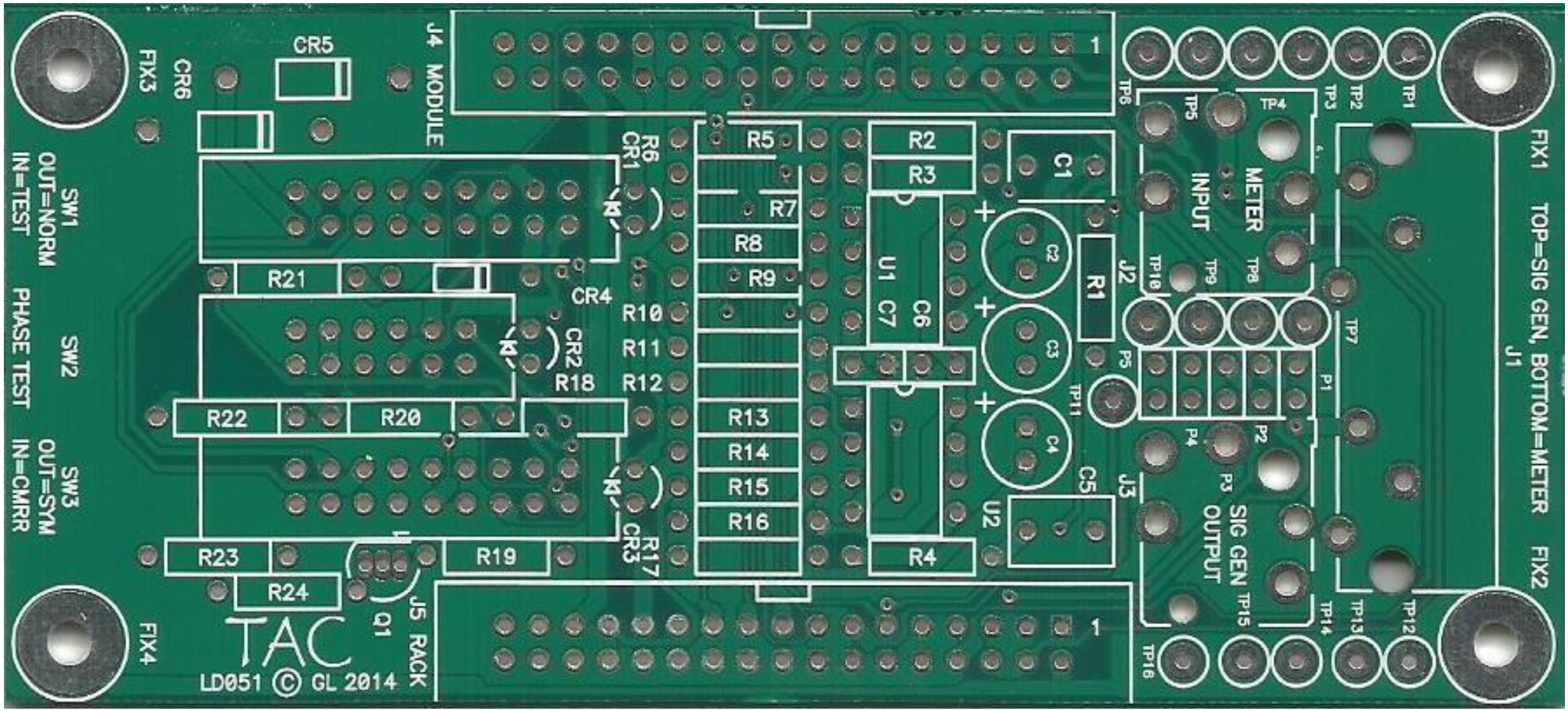
1	2N3906 TRANSISTOR	Q1	RAPID 81-0281	
2	100nF/50V CERAMIC	C6	FARNELL 114-1775	(X7R NOT Y5V)
		C7		
2	470n 5mm 5% FILM	C1	FARNELL 116-6041	
		C5		
2	47u/25V	C2	FARNELL 184-8541	
	47u/25V	C4		
1	47u/25V	C3	THIS COULD BE A 47R RESISTOR IF DC OPERATION IS REQUIRED/SEE TEXT	
2	8PIN DIL SOCKET		RAPID 22-1720	
3	LED2MM GREEN	CR1	RAPID 56-0705	
	LED2MM RED	CR2	RAPID 56-0702	
	LED2MM YELLOW	CR3	RAPID 56-0710	
2	SWITCH 6 POLE	SW1	FARNELL 112-3859	LATCHING
		SW3		
1	SWITCH 4 POLE	SW2	FARNELL 112-3858	LATCHING
2	NEUTRIK JACK SOCKET	J2	CANFORD 43-278	NJ5FD-V
		J3		

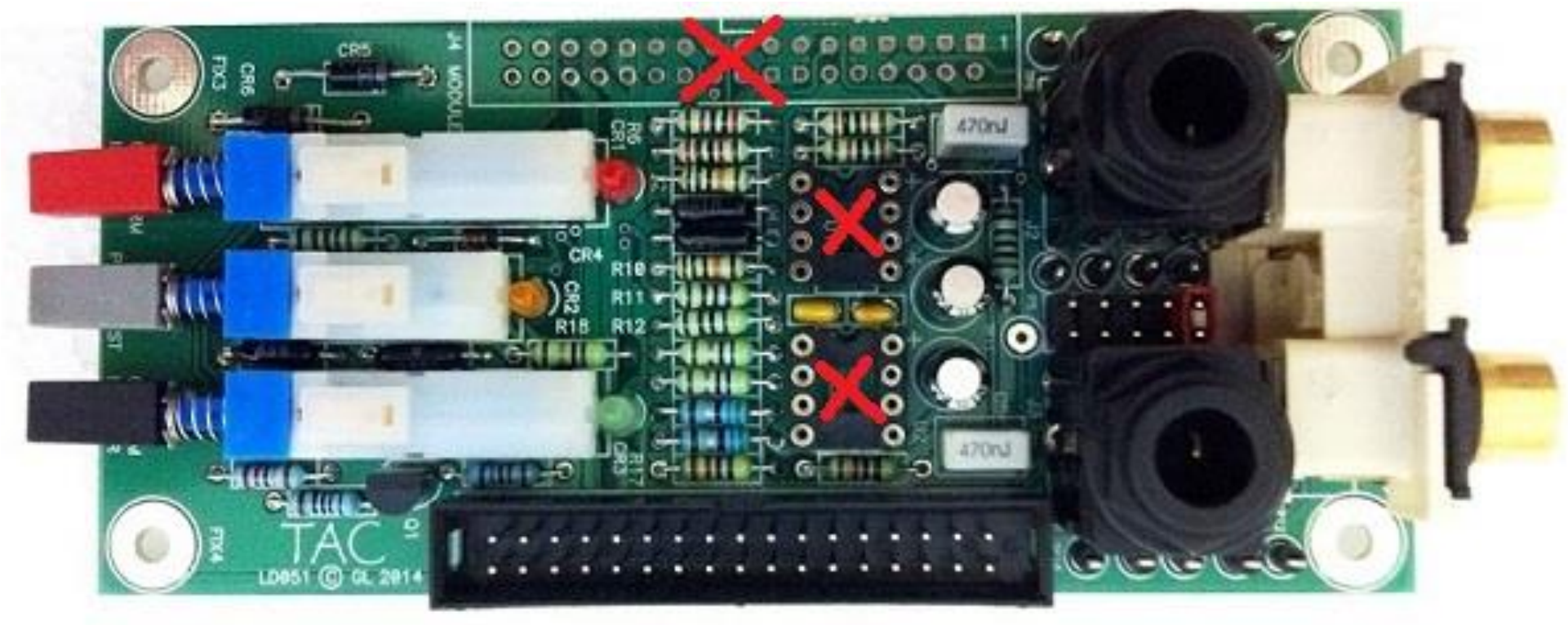
1	QUAD PHONO SOCKET	J1	RAPID 20-1320
1	34 WAY MALE BOX HEADER	J5	RAPID 19-0525
1	34 WAY TRANSITION HEADER	J4	RAPID 19-0365
1	34 WAY FEMALE IDC HEADER		RAPID 19-0320
1	34 WAY RIBBON CABLE 20cm		
2	OP275GP	U1	FARNELL 960-3760
	OP275GP	U2	
4	FEET + M3x6 SCREW		SPACERS OR PILLARS?

MODULE EXTENDER BILL OF MATERIALS

1	LD053 EDGE CONNECTOR CARD	TAC
1	EDGE CONNECTOR 18PIN	TAC
1	34 WAY MALE BOX HEADER	RAPID 19-0525
19	TESTPOINT / HUGHES (SMALL)	RAPID 17-1810
1	LD054 FINGER CARD	TAC
1	34 WAY TRANSITION HEADER	RAPID 19-0365
1	34 WAY FEMALE IDC HEADER	RAPID 19-0320
1	34 WAY RIBBON CABLE 50cm	
1	TESTPOINT	RAPID 17-1810

CMRR / SYMMETRY CARD



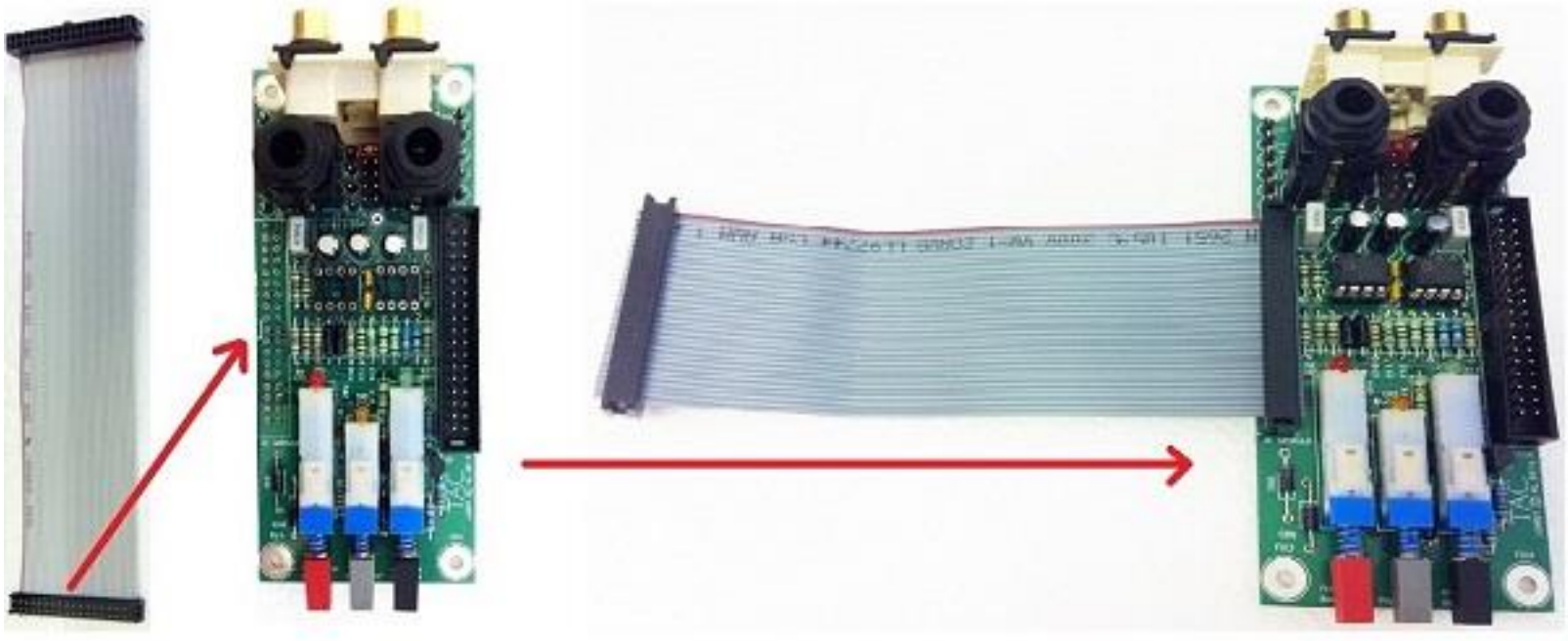


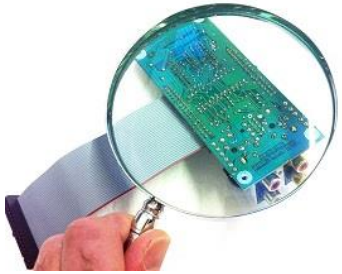
Assembly of the boards starts with the smallest components such as the diodes and resistors. Please follow he BOM as it lists the components in the correct order of assembly.

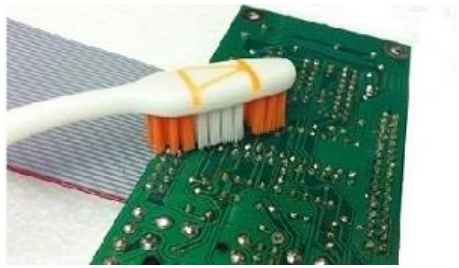
DO NOT SOLDER J4 / PCB TRANSITION HEADER. This is first fitted onto the ribbon cable.

DO NOT FIT U1 and U2 / OP275GP. These are fitted after all of the components are soldered.

Solder the shorter ribbon cable (PCB transition header). Check all of your soldering and brush the board to clean off the solder drops that may have occurred during soldering. Then insert the opamps.

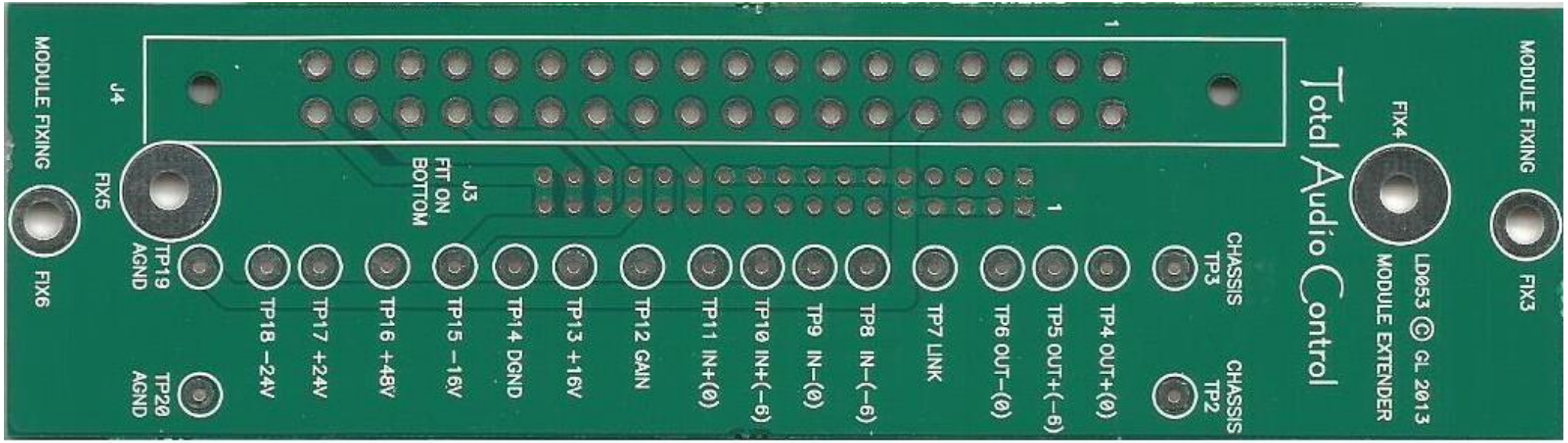






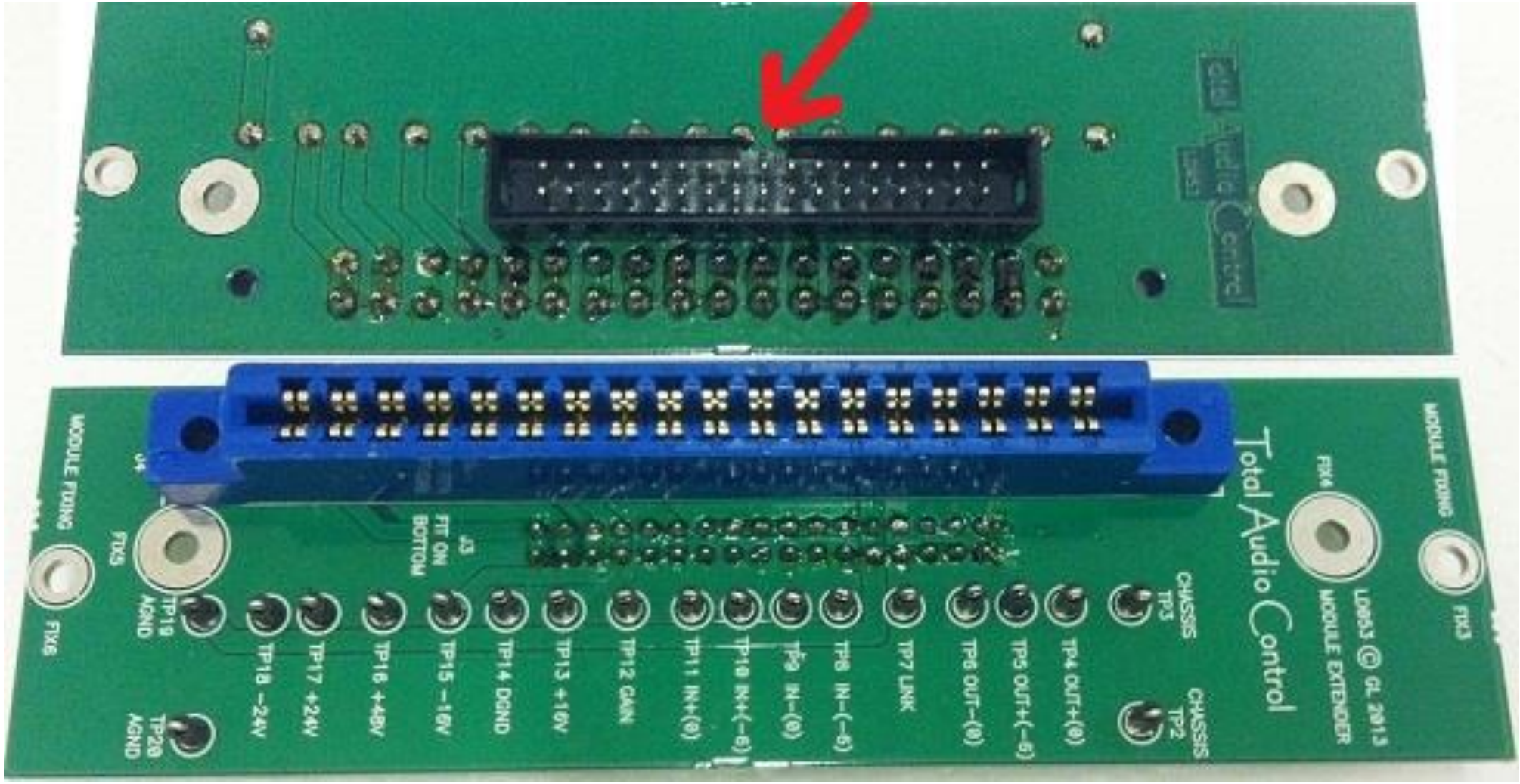
MODULE EXTENDER

Edge Connector Card

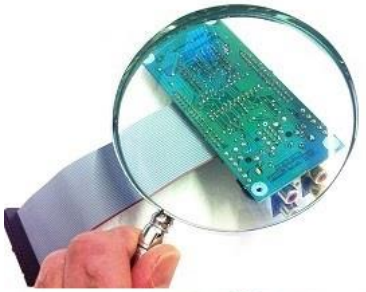


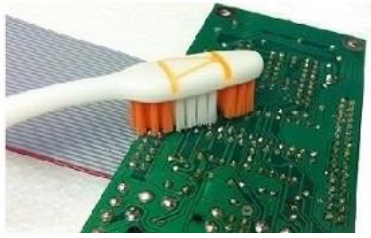
Finger Card

- Solder the male box header J3 at the bottom. Watch the polarity notch and check against the ribbon cable.
- Solder card edge connector J4 on the top.
- Solder the test points.



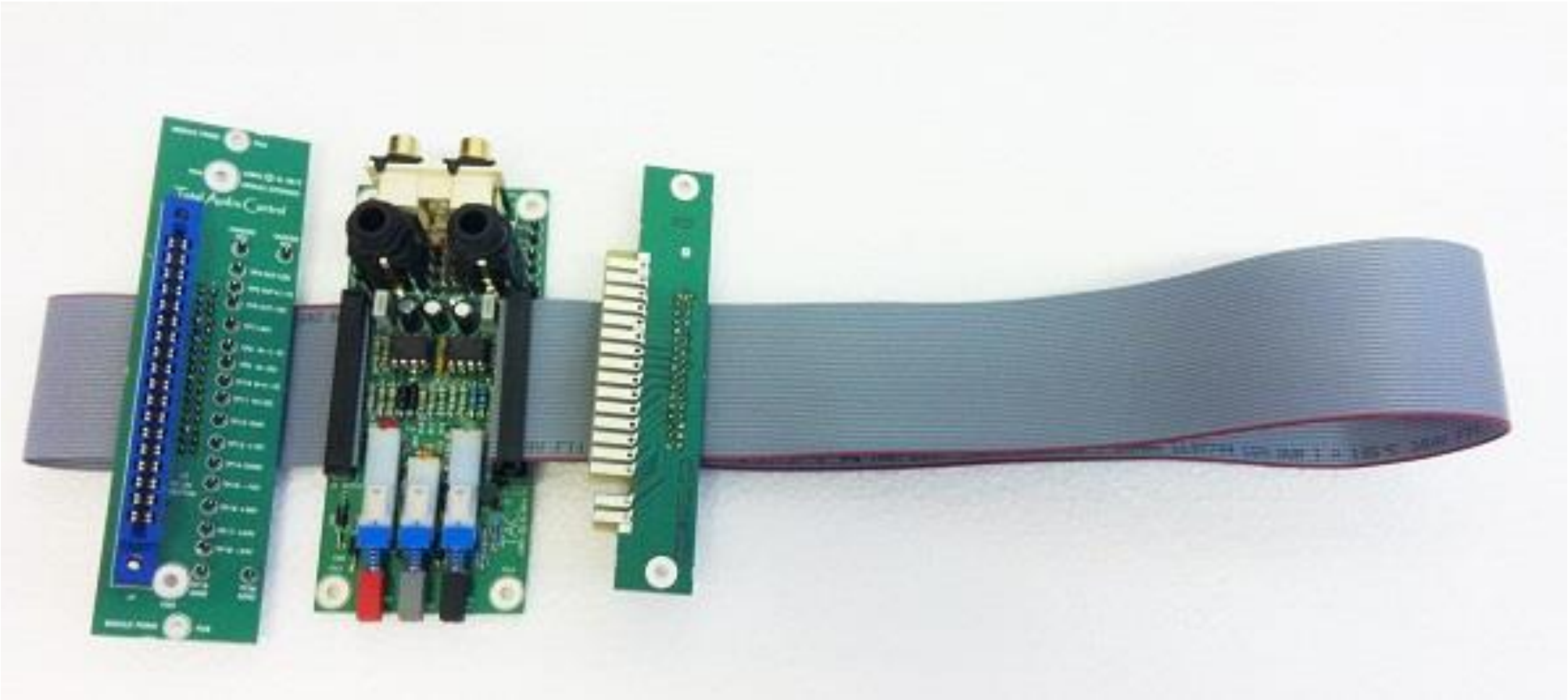
- Solder the longer ribbon cable (PCB transition header). Check all of your soldering and brush off the solder drops that may have occurred.
- Solder the test point TP1.





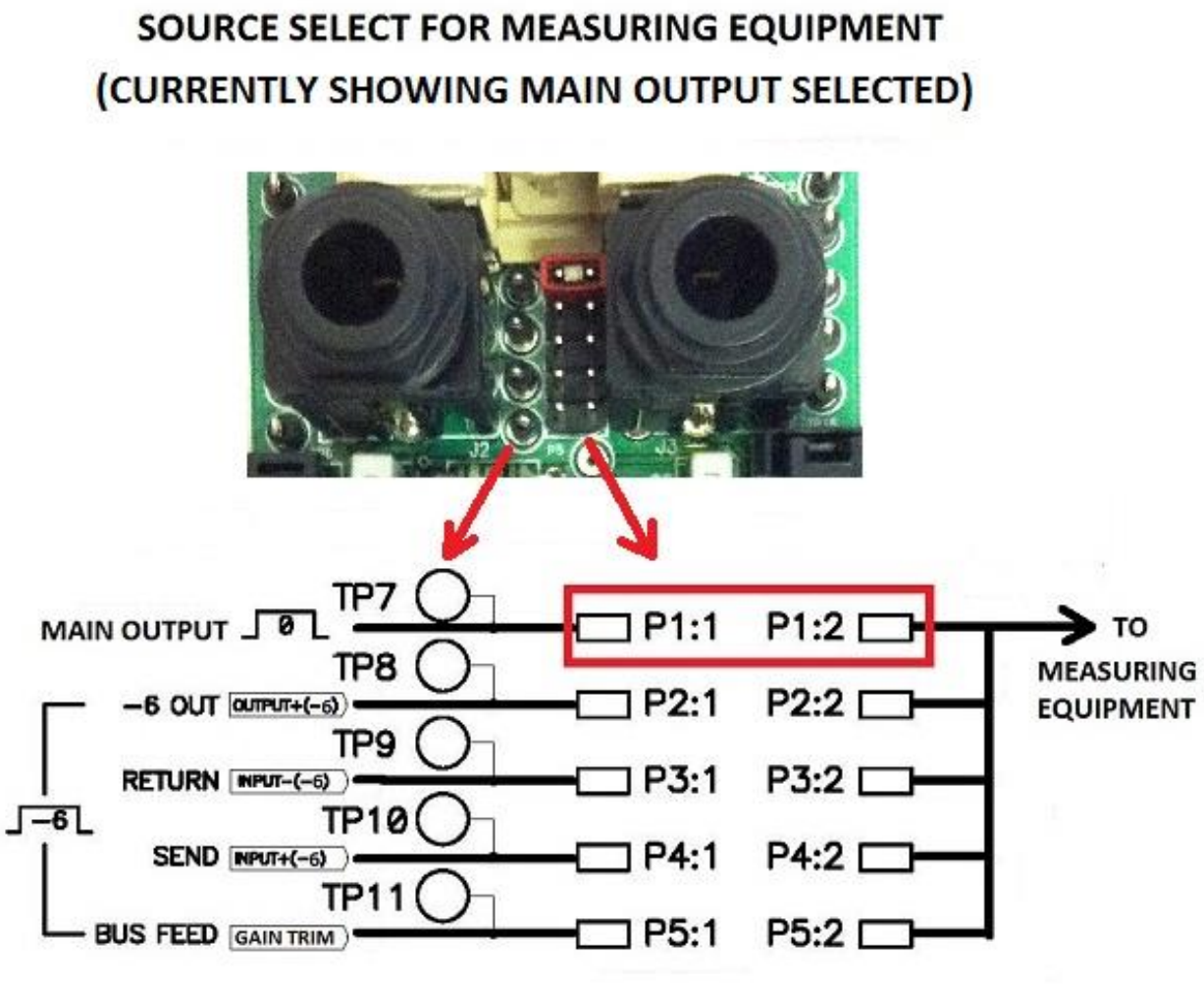
Complete MODULE EXTENDER assembly.

Complete CMRR/SYMMETRY TRIMMING JIG assembly.



APPLICATIONS MANUAL

CONNECTIONS:



- P1/TP7 Is connected to the METER INPUT unbalancing/symmetry measurement output circuitry.

This allows checking of module main output and output Symmetry. The signal will be unbalanced and may be routed to the measurement sockets by selecting the appropriate jumper. This is the default connection.

- P2/TP8 Is connected to PIN 3 of the rack edge connector.

This allows checking of any Insert -6 OUT signal. The signal will be unbalanced and may be routed to the measurement sockets by selecting the appropriate jumper.

- P3/TP9 Is connected to PIN 7 of the rack edge connector.

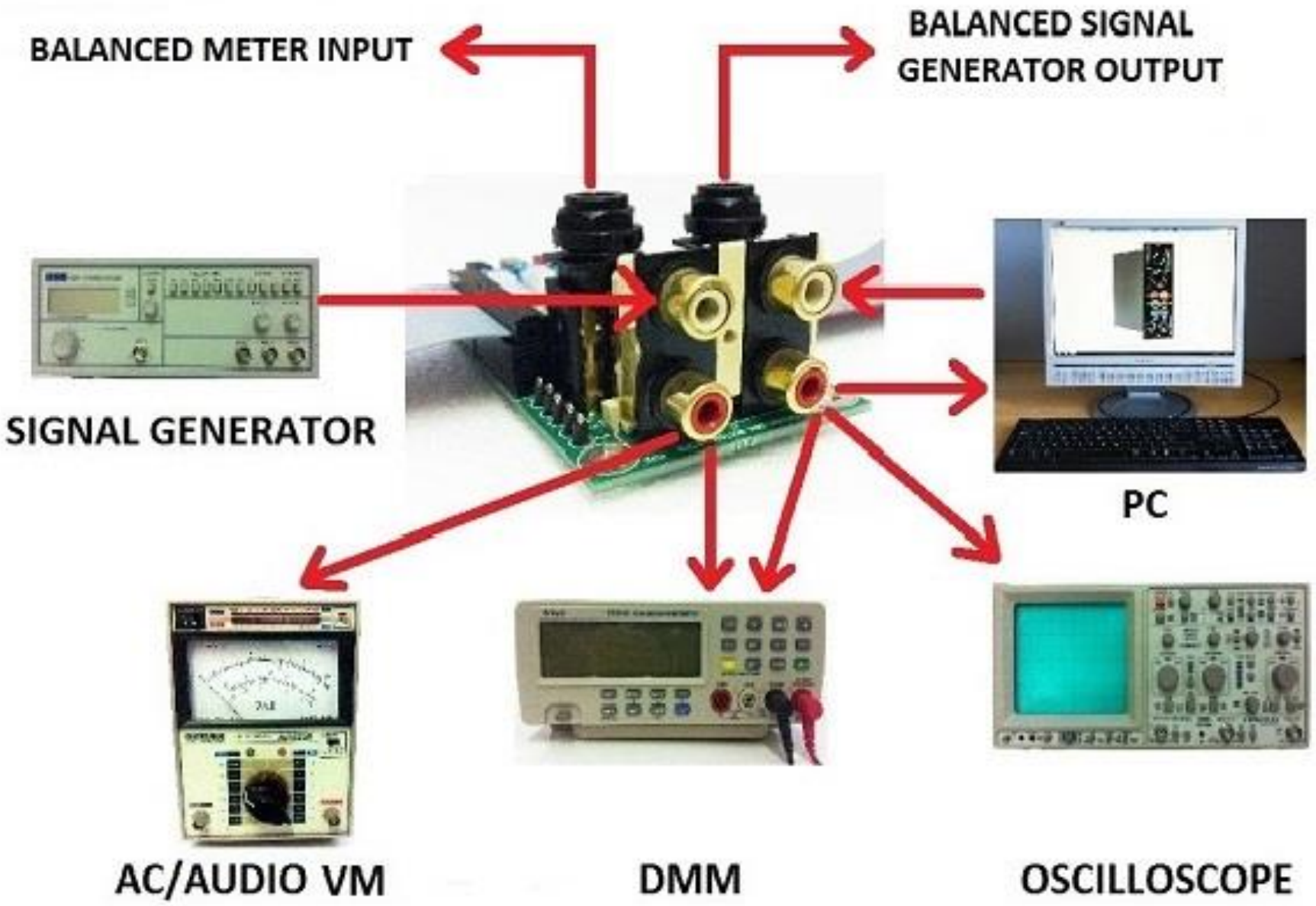
This allows checking of any Insert Return signal. The signal will be unbalanced and may be routed to the measurement sockets by selecting the appropriate jumper.

- P4/TP10 Is connected to PIN 9 of the rack edge connector.

This allows checking of any Insert Send signal. The signal will be unbalanced and may be routed to the measurement sockets by selecting the appropriate jumper.

- P5/TP11 Is connected to PIN 11 of the rack edge connector.

This allows checking of any Bus send signal. The signal will be unbalanced and may be routed to the measurement sockets by selecting the appropriate jumper.


BALANCED METER INPUT
BALANCED SIGNAL GENERATOR OUTPUT
SIGNAL GENERATOR
PC
AC/AUDIO VM
DMM
OSCILLOSCOPE

PHONO connectors are provided for connection to test equipment and/or computer. These are unbalanced connections.

Top two sockets are for the connection of a signal generator and are wired in parallel.

Bottom two sockets are for the connection of measuring equipment – DVM/oscilloscope/computer and also wired in parallel.

Additionally test points are provided for each of these lines for connecting using probes.

A balanced standard jack plug allows for a balanced feed to be produced from the unbalanced PHONO input. This feeds the PHASE and CMRR test circuitry which is situated before the jack output and can therefore be used to test other equipment or systems.

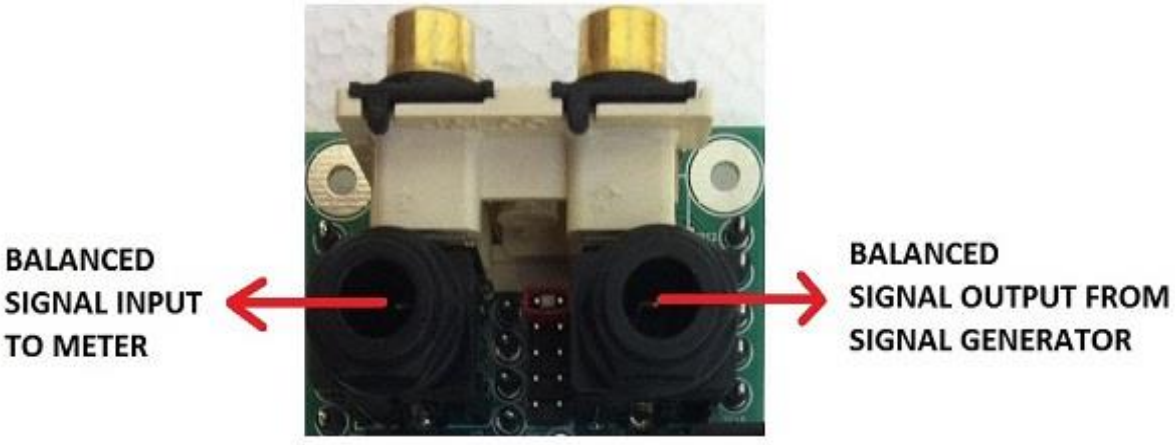
Similarly, a balanced standard jack plug allows for an external balanced feed to be connected to the measuring equipment.

Inserting jack plugs in either of these sockets breaks the original signal path

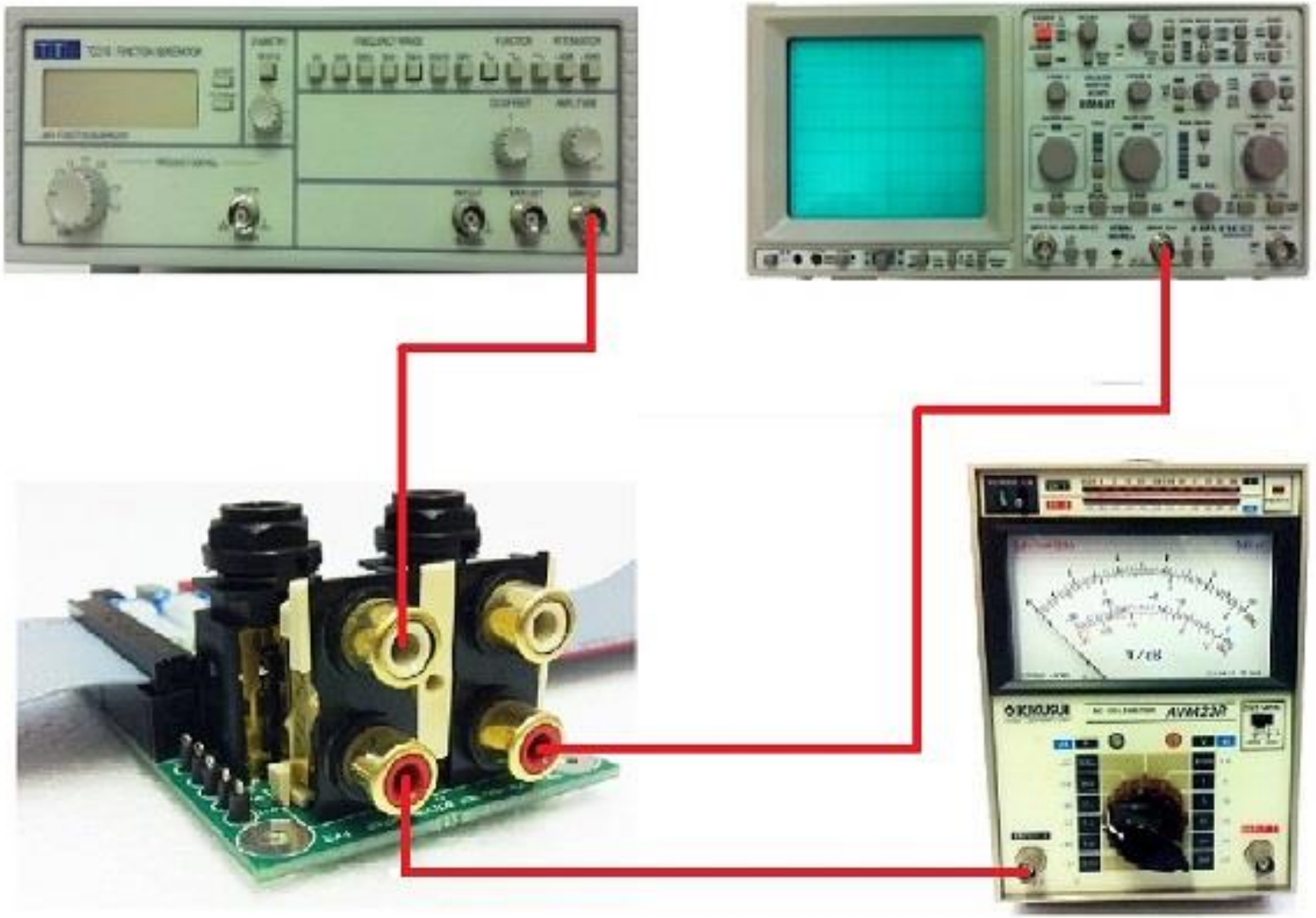
TESTING OTHER (THAN 500 SERIES) EQUIPMENT

An external signal (balanced or unbalanced) may be introduced via METER INPUT jack socket, overriding the signal from the DUT. This allows an external signal to be measured. The source will see a 600R load from the jig. This can be removed by selecting CMRR

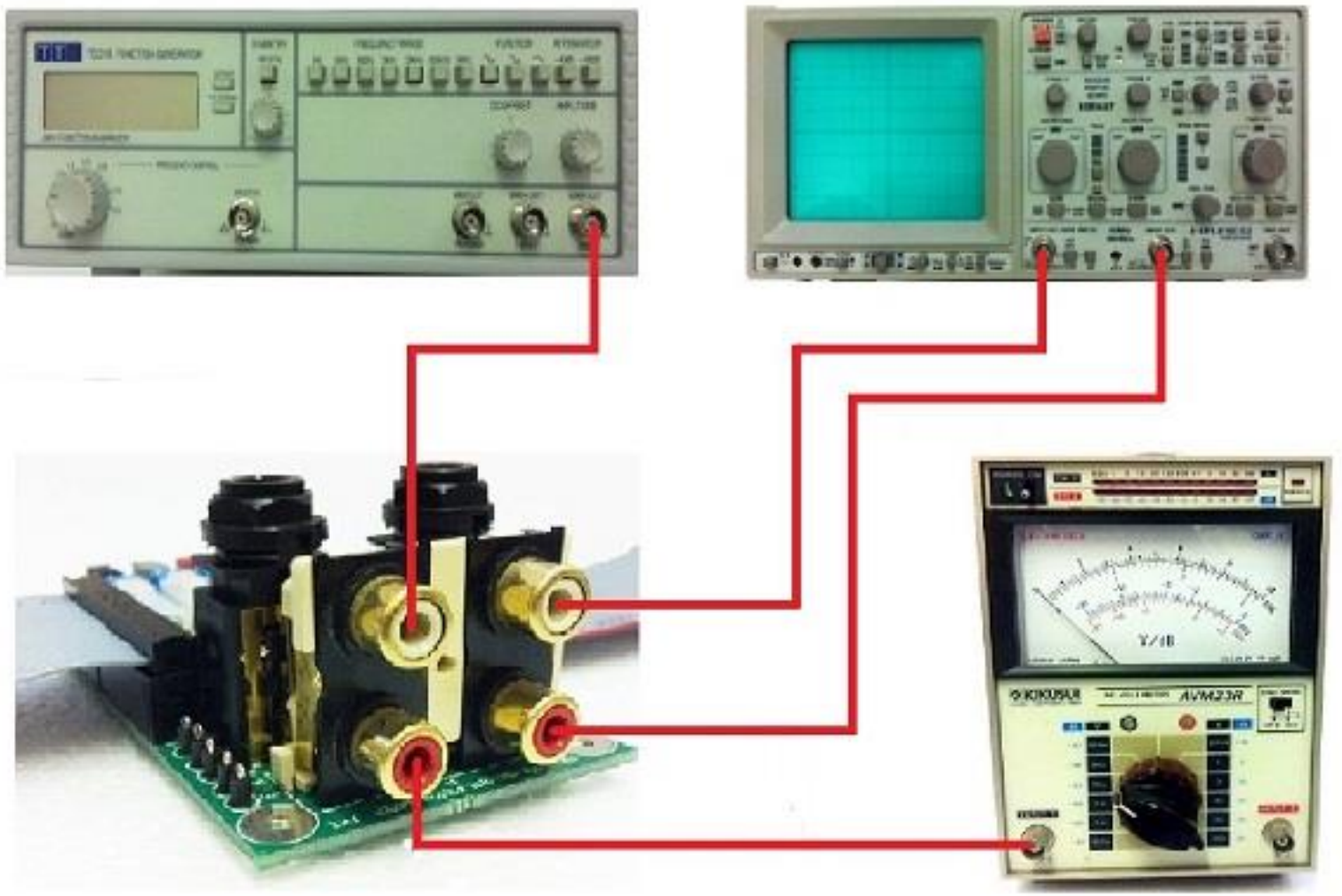
The SIGNAL GENERATOR OUTPUT jack can be used to provide a signal to external equipment. Inserting a plug breaks the feed to the DUT. The signal available is independent of the NORMAL/TEST switch but does follow the CMRR/SYM switch. Therefore when this switch is set to CMRR the output is fed from two 150R resistors sourced from an unbalanced feed for CMRR measurements, and when SYM is selected a normal balanced feed is available.



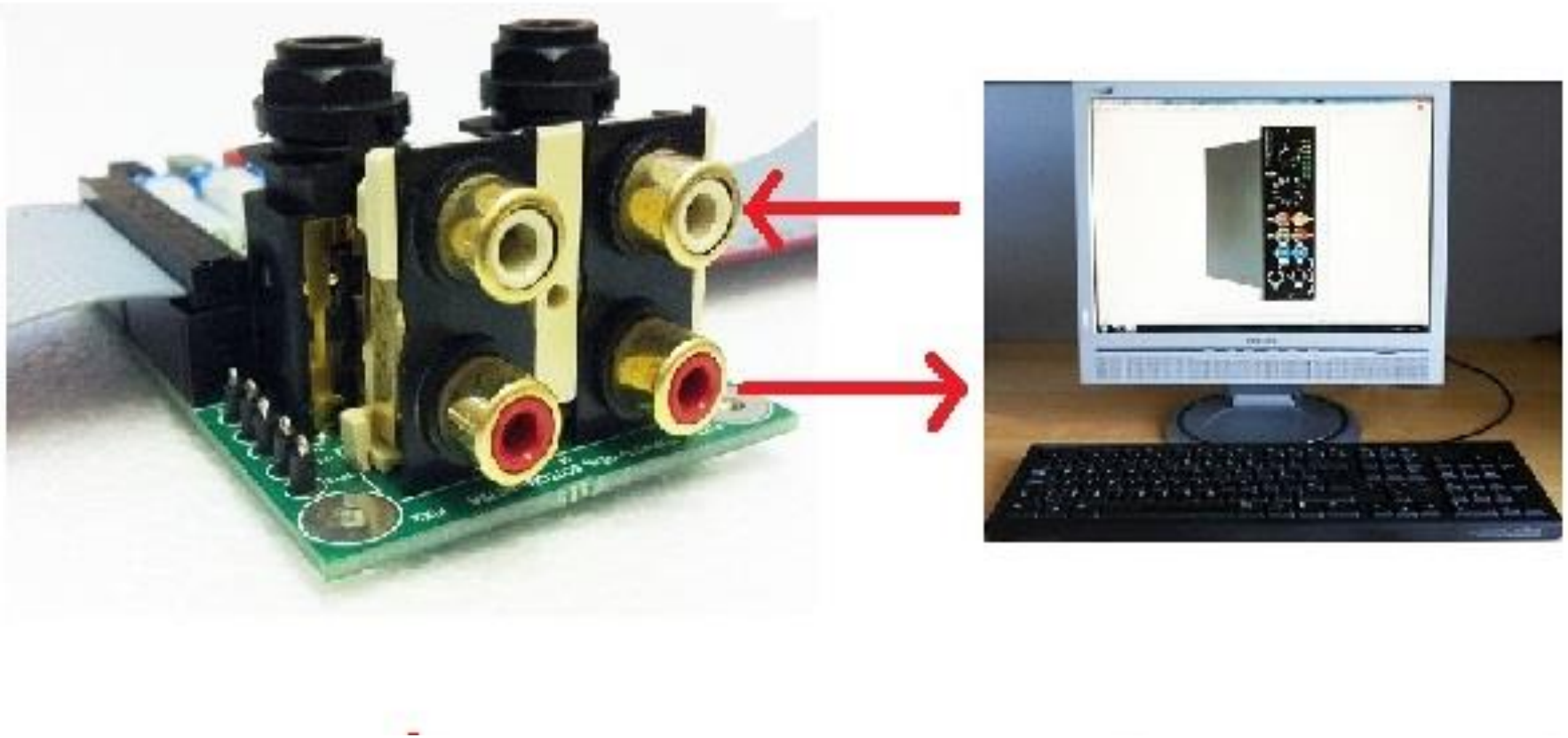
Basic test set-up using a signal generator and AC Voltmeter.



An oscilloscope is added as a second meter.



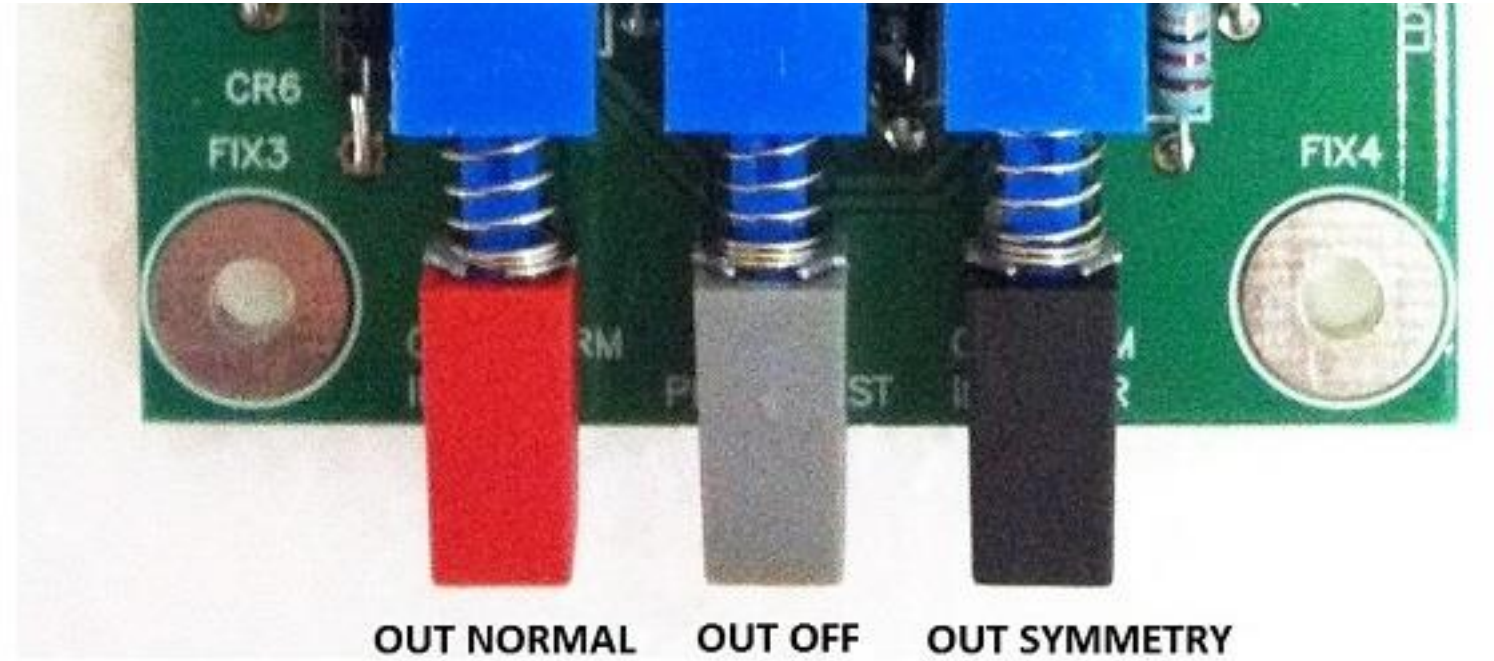
Parallel output from the second/top phono is fed into the first (or second) channel of the scope to monitor the test signal.



The test signal output from the computer is applied to one of the top phono connector. The output signal is fed back to the computer from one of the bottom phono connector. An oscilloscope and/or AC voltmeter can also be connected to the spare phono connectors for monitoring/reading.

For computer use it is recommended to use software from True Audio or similar.
http://www.trueaudio.com/rta_abt1.htm - the free version is sufficient to carry out the tests

FUNCTION SWITCHES



NORMAL OPERATION

Unbalanced signal source is applied to the INPUT (top) phono. Unbalanced measuring equipment is connected to the OUTPUT (bottom) phono. The test jig buffers and balances the signal and feeds to the PHASE switch arrangement and then to the input of the device under test (DUT). The signal passes through the module and the output is loaded by 600 ohms and feeds a differential amplifier via the break contacts of the METER IN jack. The resulting unbalanced signal is fed to the OUTPUT phono, which is connected to the measuring equipment.

The PHASE switch:

This is positioned in the balanced feed derived from the INPUT phono. It is before the SIGNAL GENERATOR output jack enabling checks to be carried out on any (other) equipment. The signal input must be at least 0dBu as the circuit is simply a diode blocking the positive phase of the signal in order to make it asymmetrical.

WITH THE NORMAL/TEST switch set to NORMAL:

The signal passes directly from the INPUT phono, via the PHASE switch and DUT to the OUTPUT (METER) phono.

This enables characteristics of the DUT to be measured (such as frequency response).

This jig is not intended for carrying out noise measurements as the noise of the jig itself may exceed that of the DUT.

The PHASE switch is available in NORMAL mode.

WITH THE NORMAL/TEST switch set to TEST:

The SYM/CMRR switch selects the required function.

The PHASE switch is disabled.

SYMMETRY TESTING:

Set the gain control of the DUT no higher than 40dB (A typical, practical setting), otherwise noise generated by the circuit may affect the results.

Set SW1 to NORMAL. Set SW3 to SYMMETRY

On the signal generator, select low output impedance and a frequency of 20kHz.

Adjust the signal generator level to obtain an output from the device under test of +20dBu.

Press SW1 to TEST.

Now the output of the DUT feeds a 600 ohm load which is formed from two 300 ohm resistors in series. An unbalanced feed is taken from the midpoint of the load. Ideally there should be no output at this point when the signals on both output legs of the DUT are identical. This is of course never going to be the case.

Adjust the input SYMMETRY trimmer for minimum reading at the output (meter).

CMRR TESTING

Set the gain control of the DUT no higher than 40dB (A typical, practical setting), otherwise noise generated by the circuit may affect the results.

Set SW1 to NORMAL. Set SW3 to CMRR.

On the signal generator, select low output impedance and a frequency of 50kHz.

Adjust the signal generator level to obtain an output from the device under test of +20dBu.

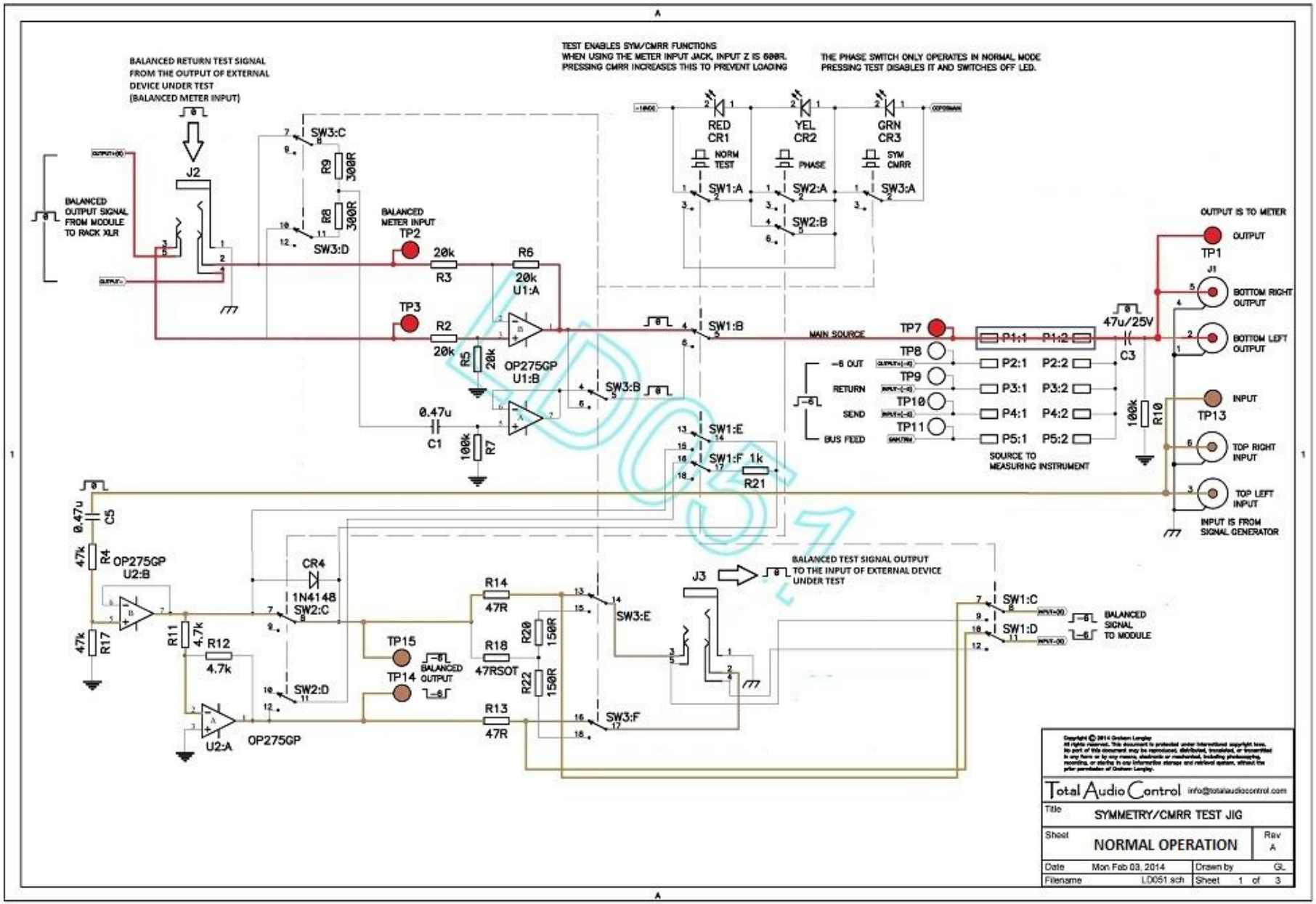
Press SW1 to TEST.

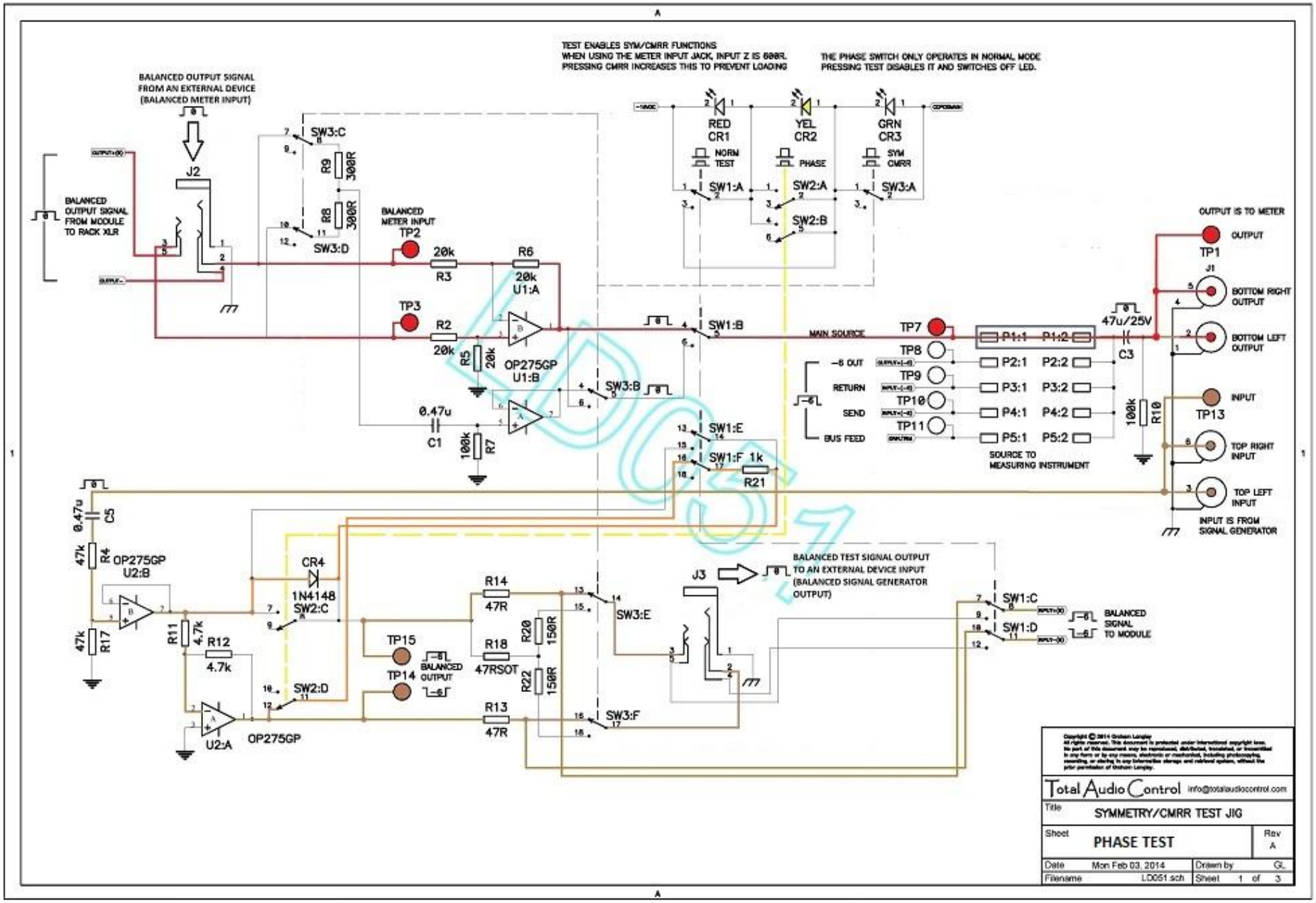
Now the input to the DUT is fed from an unbalanced signal to two 150R resistors (one in each leg). Ideally the preamplifier should not produce any output because identical signals are presented to the hot and cold inputs. However, this will of course never be the case in practice.

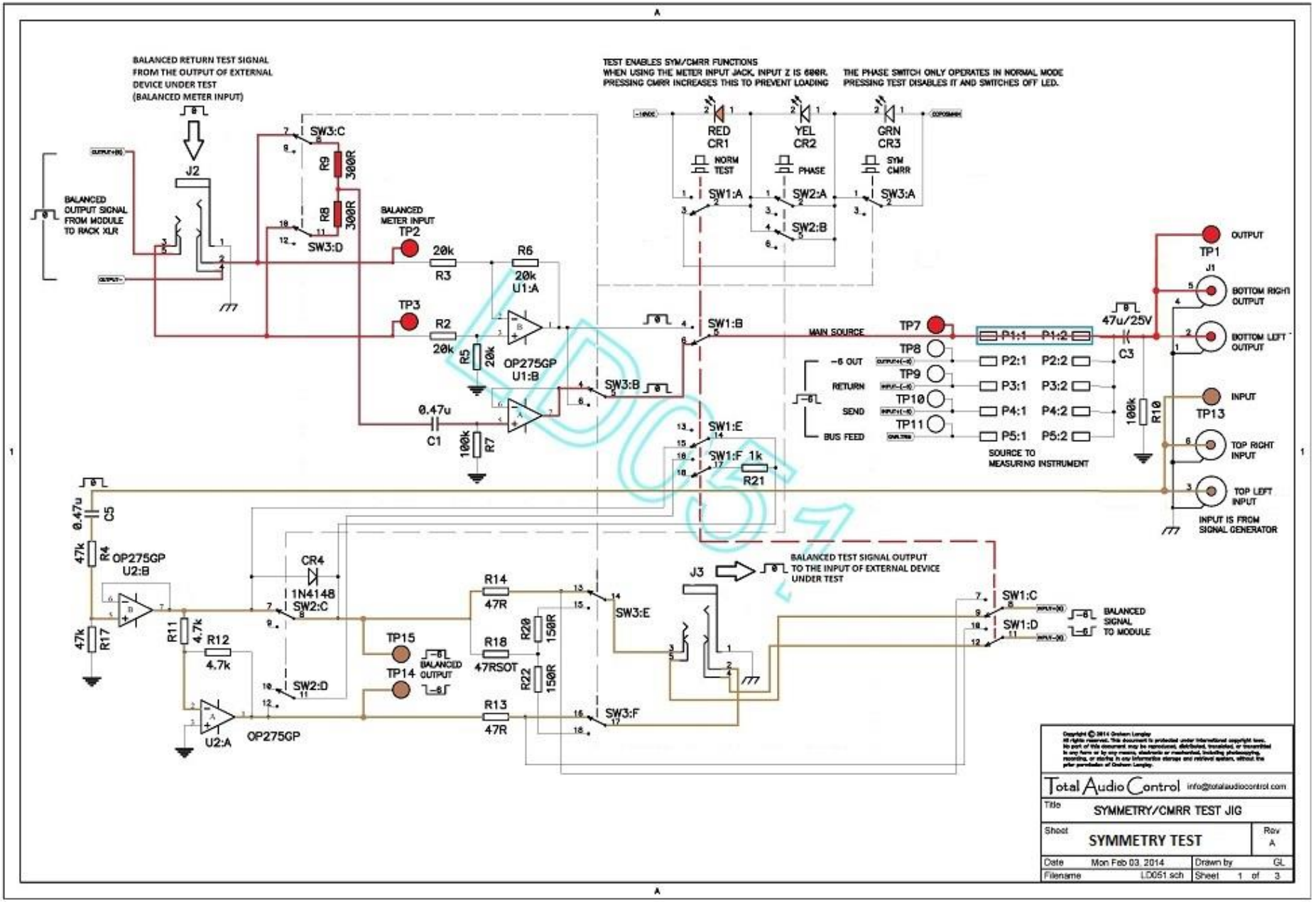
Adjust the input CMRR trimmer variable capacitor for minimum reading at the output (meter).

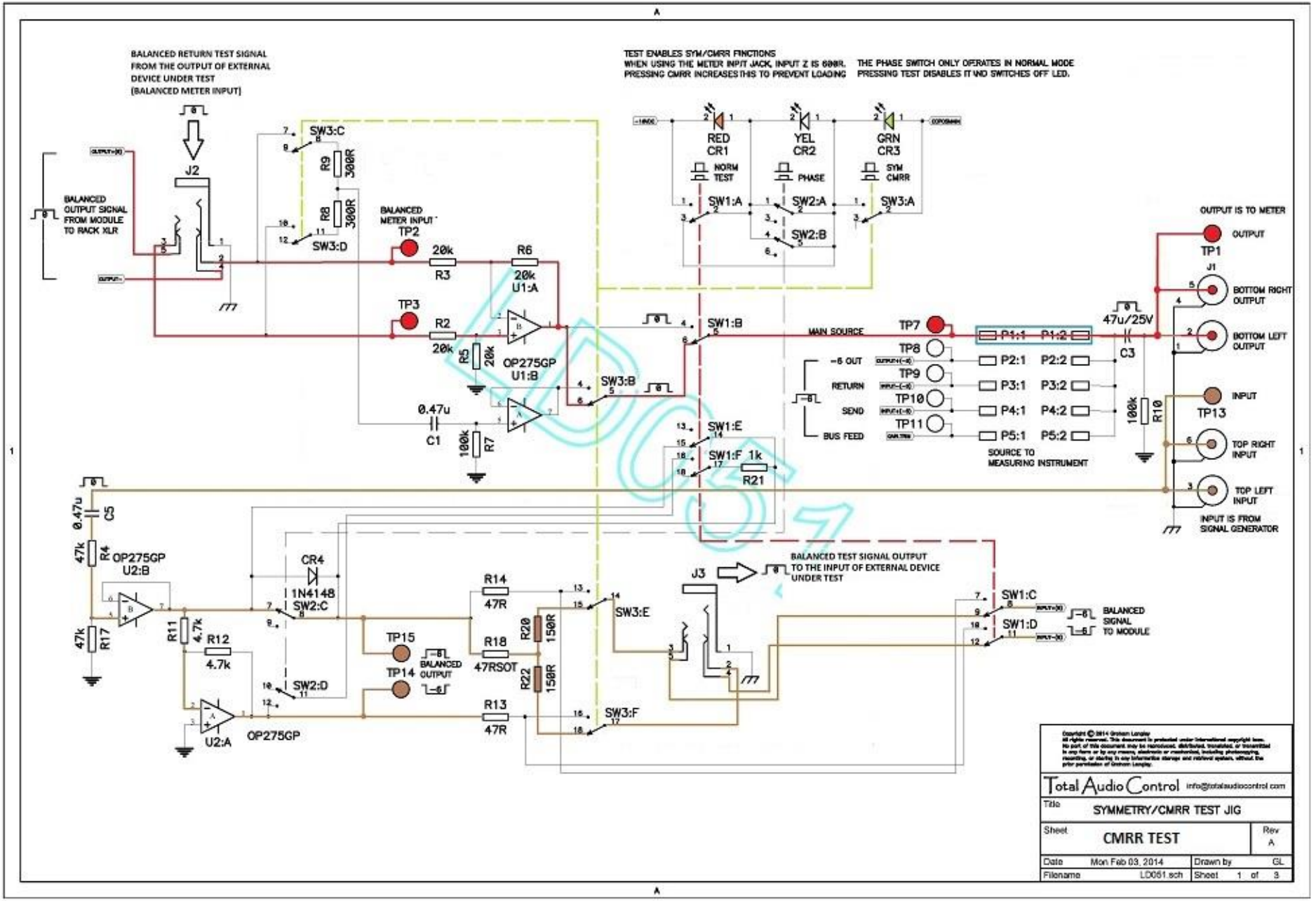
Trimming CMRR with the source connected directly to the microphone amplifier does not take into account any distributed cable capacitance, so connection of a cable to the rack input XLR will alter the results obtained.

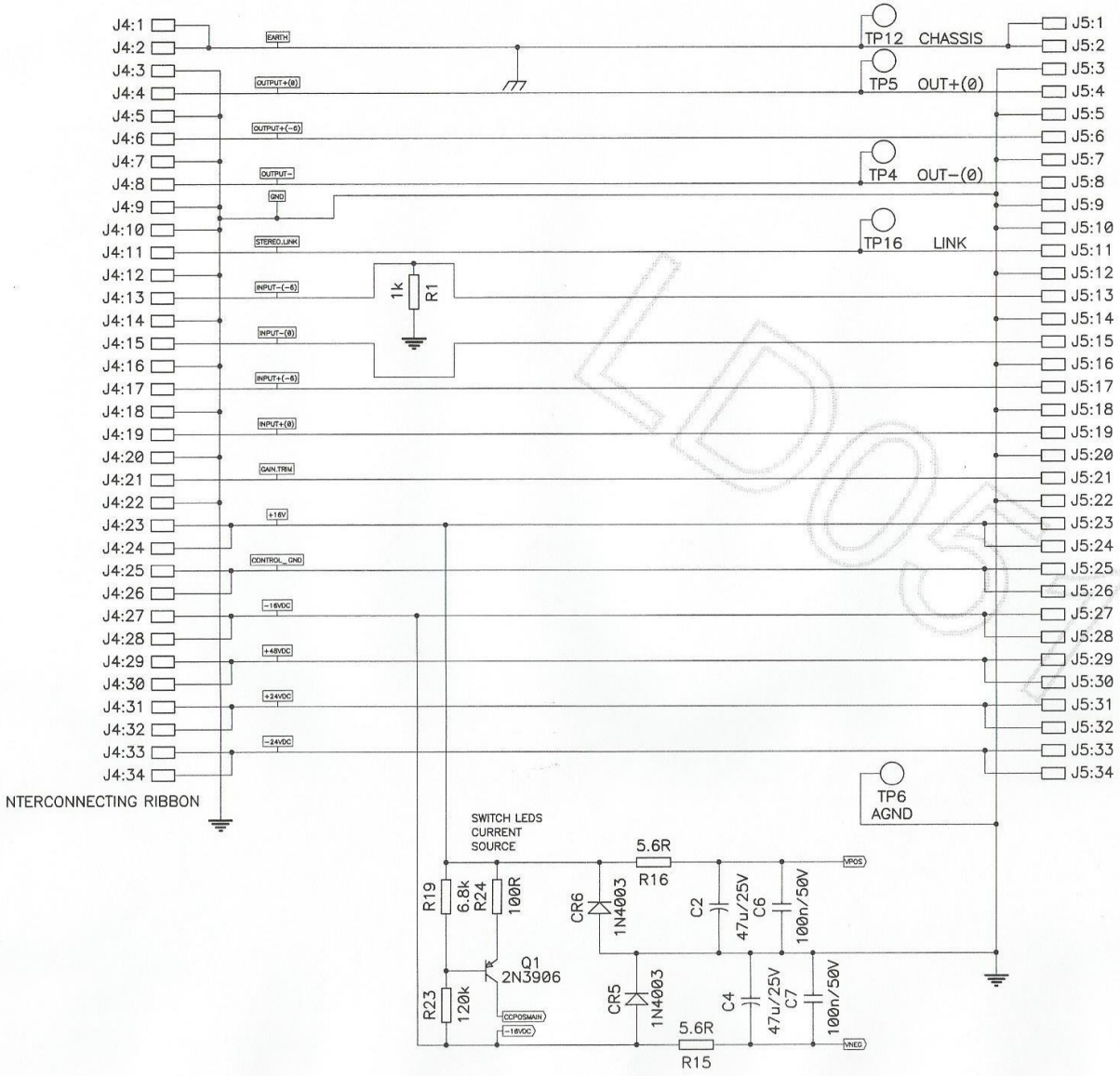
The CMRR obtainable is dependent on the source impedance and any imbalance between components in the HI and LO signal paths. CMRR worsens with increasing source impedance for a given trimmer setting.


BALANCED RETURN TEST SIGNAL FROM THE OUTPUT OF EXTERNAL DEVICE UNDER TEST (BALANCED METER INPUT)
TEST ENABLES SYM/CMRR FUNCTIONS WHEN USING THE METER INPUT JACK, INPUT Z IS 600R. PRESSING CMRR INCREASES THIS TO PREVENT LOADING
THE PHASE SWITCH ONLY OPERATES IN NORMAL MODE PRESSING TEST DISABLES IT AND SWITCHES OFF LED.
BALANCED OUTPUT SIGNAL FROM MODULE TO RACK XLR
J2
SW3:C
SW3:D
R9 300R
R8 300R
BALANCED METER INPUT
TP2
TP3
20k
R3
R6
20k
U1:A
R2
20k
R5 20k
OP275GP
U1:B
0.47u
C1
100k
R7
SW1:B
SW3:B
SW1:E
SW1:F 1k
R21
RED CR1
YEL CR2
GRN CR3
NORM TEST
PHASE
SYM CMRR
SW1:A
SW2:A
SW2:B
SW3:A
MAIN SOURCE
TP7
TP8
TP9
TP10
TP11
-6 OUT
RETURN
SEND
BUS FEED
P1:1 P1:2
P2:1 P2:2
P3:1 P3:2
P4:1 P4:2
P5:1 P5:2
SOURCE TO MEASURING INSTRUMENT
47u/25V
C3
100k
R10
OUTPUT IS TO METER
OUTPUT
TP1
J1
BOTTOM RIGHT OUTPUT
BOTTOM LEFT OUTPUT
INPUT
TP13
TOP RIGHT INPUT
TOP LEFT INPUT
INPUT IS FROM SIGNAL GENERATOR
0.47u
C5
47k
R4
OP275GP
U2:B
CR4
1N4148
SW2:C
R11
4.7k
R12
4.7k
47k
R17
SW2:D
U2:A
OP275GP
TP15
TP14
BALANCED OUTPUT
R14
47R
R18
47RSOT
R13
47R
R20 150R
R22 150R
SW3:E
SW3:F
J3
BALANCED TEST SIGNAL OUTPUT TO THE INPUT OF EXTERNAL DEVICE UNDER TEST
SW1:C
SW1:D
BALANCED SIGNAL TO MODULE
Total Audio Control
info@totalaudiocontrol.com
Title
SYMMETRY/CMRR TEST JIG
Sheet
NORMAL OPERATION
Rev A
Date Mon Feb 03, 2014
Drawn by GL
Filename LD051.sch
Sheet 1 of 3


TEST ENABLES SYM/CMRR FUNCTIONS
WHEN USING THE METER INPUT JACK, INPUT Z IS 600R.
PRESSING CMRR INCREASES THIS TO PREVENT LOADING
THE PHASE SWITCH ONLY OPERATES IN NORMAL MODE
PRESSING TEST DISABLES IT AND SWITCHES OFF LED.
BALANCED OUTPUT SIGNAL FROM AN EXTERNAL DEVICE (BALANCED METER INPUT)
BALANCED OUTPUT SIGNAL FROM MODULE TO RACK XLR
J2
SW3:C
SW3:D
R9 300R
R8 300R
BALANCED METER INPUT
TP2
TP3
20k R3
R6 20k
U1:A
R2 20k
R5 20k
OP275GP U1:B
0.47u C1
100k R7
SW3:B
SW1:B
SW1:E
SW1:F 1k R21
RED CR1
YEL CR2
GRN CR3
NORM TEST
PHASE
SYM CMRR
SW1:A
SW2:A
SW2:B
SW3:A
OUTPUT IS TO METER
OUTPUT
TP1
J1
BOTTOM RIGHT OUTPUT
BOTTOM LEFT OUTPUT
INPUT
TP13
TOP RIGHT INPUT
TOP LEFT INPUT
INPUT IS FROM SIGNAL GENERATOR
MAIN SOURCE
TP7
P1:1 P1:2
47u/25V C3
-6 OUT
RETURN
SEND
BUS FEED
TP8
TP9
TP10
TP11
P2:1 P2:2
P3:1 P3:2
P4:1 P4:2
P5:1 P5:2
SOURCE TO MEASURING INSTRUMENT
100k R10
0.47u C5
47k R4
OP275GP U2:B
47k R17
CR4
1N4148
SW2:C
R11 4.7k
R12 4.7k
SW2:D
U2:A OP275GP
TP15
TP14
BALANCED OUTPUT
R14 47R
R18 47RSOT
R13 47R
R20 150R
R22 150R
SW3:E
SW3:F
J3
BALANCED TEST SIGNAL OUTPUT TO AN EXTERNAL DEVICE INPUT (BALANCED SIGNAL GENERATOR OUTPUT)
SW1:C
SW1:D
BALANCED SIGNAL TO MODULE
Total Audio Control info@totalaudiocontrol.com
Title SYMMETRY/CMRR TEST JIG
Sheet PHASE TEST
Rev A
Date Mon Feb 03, 2014
Drawn by GL
Filename LD051.sch
Sheet 1 of 3


BALANCED RETURN TEST SIGNAL FROM THE OUTPUT OF EXTERNAL DEVICE UNDER TEST (BALANCED METER INPUT)
TEST ENABLES SYM/CMRR FUNCTIONS WHEN USING THE METER INPUT JACK, INPUT Z IS 600R. PRESSING CMRR INCREASES THIS TO PREVENT LOADING
THE PHASE SWITCH ONLY OPERATES IN NORMAL MODE PRESSING TEST DISABLES IT AND SWITCHES OFF LED.
J2
BALANCED OUTPUT SIGNAL FROM MODULE TO RACK XLR
SW3:C
SW3:D
R9 300R
R8 300R
BALANCED METER INPUT
TP2
TP3
20k R3
R2 20k
R6 20k U1:A
R5 20k
OP275GP U1:B
0.47u C1
100k R7
SW1:B
SW3:B
SW1:E
SW1:F 1k R21
RED CR1
YEL CR2
GRN CR3
NORM TEST
PHASE
SYM CMRR
SW1:A
SW2:A
SW2:B
SW3:A
MAIN SOURCE
TP7
-6 OUT
TP8
RETURN
TP9
SEND
TP10
BUS FEED
TP11
P1:1 P1:2
P2:1 P2:2
P3:1 P3:2
P4:1 P4:2
P5:1 P5:2
SOURCE TO MEASURING INSTRUMENT
47u/25V C3
100k R10
OUTPUT
TP1
J1
BOTTOM RIGHT OUTPUT
BOTTOM LEFT OUTPUT
INPUT
TP13
TOP RIGHT INPUT
TOP LEFT INPUT
INPUT IS FROM SIGNAL GENERATOR
0.47u C5
47k R4
OP275GP U2:B
47k R17
R11 4.7k
R12 4.7k
CR4
1N4148
SW2:C
SW2:D
TP15
TP14
BALANCED OUTPUT
OP275GP U2:A
R14 47R
R18 47RSOT
R13 47R
R20 150R
R22 150R
SW3:E
SW3:F
J3
BALANCED TEST SIGNAL OUTPUT TO THE INPUT OF EXTERNAL DEVICE UNDER TEST
SW1:C
SW1:D
BALANCED SIGNAL TO MODULE
Total Audio Control
info@totalaudiocontrol.com
Title
SYMMETRY/CMRR TEST JIG
Sheet
SYMMETRY TEST
Rev A
Date Mon Feb 03, 2014
Drawn by GL
Filename LD051.sch
Sheet 1 of 3

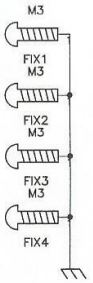

BALANCED RETURN TEST SIGNAL FROM THE OUTPUT OF EXTERNAL DEVICE UNDER TEST (BALANCED METER INPUT)
TEST ENABLES SYM/CMRR FINCTIONS WHEN USING THE METER INPIT JACK, INPUT Z IS 600R. PRESSING CMRR INCREASES THIS TO PREVENT LOADING
THE PHASE SWITCH ONLY OPERATES IN NORMAL MODE PRESSING TEST DISABLES IT AND SWITCHES OFF LED.
BALANCED OUTPUT SIGNAL FROM MODULE TO RACK XLR
J2
SW3:C
SW3:D
R9 300R
R8 300R
BALANCED METER INPUT
TP2
TP3
20k
R3
R6
20k
U1:A
R2
20k
R5 20k
OP275GP
U1:B
0.47u
C1
100k
R7
SW3:B
SW1:B
RED CR1
YEL CR2
GRN CR3
NORM TEST
PHASE
SYM CMRR
SW1:A
SW2:A
SW2:B
SW3:A
OUTPUT IS TO METER
OUTPUT
TP1
J1
BOTTOM RIGHT OUTPUT
BOTTOM LEFT OUTPUT
MAIN SOURCE
TP7
TP8
TP9
TP10
TP11
-6 OUT
RETURN
SEND
BUS FEED
P1:1 P1:2
P2:1 P2:2
P3:1 P3:2
P4:1 P4:2
P5:1 P5:2
SOURCE TO MEASURING INSTRUMENT
47u/25V
C3
100k
R10
INPUT
TP13
TOP RIGHT INPUT
TOP LEFT INPUT
INPUT IS FROM SIGNAL GENERATOR
SW1:E
SW1:F 1k
R21
0.47u
C5
47k
R4
OP275GP
U2:B
47k
R17
CR4
1N4148
SW2:C
R11 4.7k
R12 4.7k
SW2:D
U2:A
OP275GP
TP15
TP14
BALANCED OUTPUT
R14 47R
R18 47RSOT
R13 47R
R20 150R
R22 150R
SW3:E
SW3:F
J3
BALANCED TEST SIGNAL OUTPUT TO THE INPUT OF EXTERNAL DEVICE UNDER TEST
SW1:C
SW1:D
BALANCED SIGNAL TO MODULE
Total Audio Control
info@totalaudiocontrol.com
Title
SYMMETRY/CMRR TEST JIG
Sheet
CMRR TEST
Rev A
Date Mon Feb 03, 2014
Drawn by GL
Filename LD051.sch
Sheet 1 of 3



UNBALANCED FEEDS TO TEST BACKPLANE IF SOURCE NOT AVAILABLE FROM MODULE

1	CHASSIS GROUND	
2	OUTPUT+ (Ø LEVEL)	
3	OUTPUT+ (−6 LEVEL)/RADIAL RESERVED	
4	OUTPUT−	
5	ANALOGUE GROUND	
6	STEREO LINK	
7	INPUT− (−6 LEVEL)/OMNIPORT RING (RET)	
8	INPUT− (Ø LEVEL)	
9	INPUT+ (−6 LEVEL)/OMNIPORT TIP (SEND)	
10	INPUT+ (Ø LEVEL)	
11	GAIN TRIM RESISTOR/RADIAL BUS FEED	
12	+16VDC	
13	RELAY/LOGIC GROUND	
14	−16VDC	
15	+48VDC	
17	+24VDC	API/GROUP DIY/ RADIAL MODULE PIN DESIGNATION
18	−24VDC	

J7
CON EDGE 18FINGER DIY51



Total Audio Control info@totalaudiocontrol.com

Title	SYMMETRY/CMRR TEST JIG		
Sheet	EXTENDER CARD I/O		Rev A
Date	Mon Feb 03, 2014	Drawn by	GL
Filename	LD051.sch	Sheet	2 of 3

NOTES:

600 ohm load on DUT output:

The 600 ohm load is the normal load applied when testing professional audio equipment because it can create worst case output swing and THD conditions emulating connection of the output to multiple pieces of equipment.

When the meter is sourced from the METER INPUT jack, the load may be removed by pressing the SYM/CMRR switch to select CMRR. The load is then greater than 20k on each output leg.

Noise measurements:

Do not use the jig. Simply connect a 150 ohm resistor across the balanced rack input XLR pins 2 and 3 to provide a source.

Unbalance the output of the DUT by connecting pins 1 and 3 on the rack output XLR and feed directly to the measuring equipment.

Unbalanced input on DUT:

If it is required to connect an unbalanced source to the DUT this can be done by unbalancing the input lead The source might be a computer, oscillator or other form of unbalanced signal source.

Using the test jig with a balanced signal source:

If the user has the facilities to test with a balanced input and output, the balanced source should be unbalanced and connected to the phono INPUT.

Leaving rack output lead connected:

Signals will be present at the rack output connector so that they can be audibly monitored. The output connector may remain connected **but user should beware that high frequency signals may be present at high levels that could damage external equipment.**

PROTECTION:

No ESD or EMC filtering is provided. No HF filtering of the signal path is provided.

Outputs are DC connected.

INSERT RETURN PIN

A 1k resistor is connected to ground otherwise misleading crosstalk readings are possible when the RETURN jack is used.

DC

Much of the circuitry on the jig is DC connected other than the output capacitor C3.

C3 may be replaced by a 47R resistor to allow DC measurements.