

Orange AD30HTC/AD30TC Chassis Test Procedure

ORA-TP133-9 Issue 9 Andy Ewen 18.03.2010

For testing ORA-PC133 & ORA-PC134 assembled in chassis.

Equipment required: Multimeter(s), Signal Generator, Oscilloscope, Dummy Load, Variac, latching footswitch, guitar lead, assorted test leads.

See end of test procedure for all relevant Electronic Change Orders, (ECOs).

Initial Checks

1. Check metalwork for damage/scratches and check screenprinting for smudging & accuracy.
Check polarity of diodes and electrolytic capacitors.
Check all flying leads and transformer connections are inserted and routed correctly.
Check all crimp connectors are 'locked' onto their tabs.
Check that all PCB fuse clips are extremely tight. Remove the fuses and re-tension if necessary.
2. Check transformer primary wiring is correct for destination.
Check voltage selector is set for correct mains input.
Install all fuses. Insert all correct pre-amp & power amp valves,
(See end of test procedure for correct values).
3. Set all controls to **minimum**
Set front panel toggle switches to **POWER OFF, STANDBY & CHANNEL ONE.**

Check that **Mains Switch** is set to **OFF**
Connect unit to **16Ω** load station.
4. Connect mains inlet to Variac set at zero.
Switch unit to **STANDBY** and gradually turn up variac to required mains voltage.
(100/120/220/230 as appropriate for destination)
N.B. Test 230V units at 240V and 120V units at 120V.
Check large orange lamp is lit.

Voltage Tests

5. Check following Test Points: -

TP1 to TP2	6.3Vac ±0.1Vac (or from Yellow – Yellow on Mains TX)
TP3 to TP5	5Vac ±0.3Vac (or from Black – Red on Mains TX)

6. Turn Variac down to zero; switch from **STANDBY** to **PLAY** then turn variac back up again.

7. Check following Test Points:-

TP5	335V ±10V
TP6	320V ±10V
TP7	245V ±10V
TP8	210V ±10V

8. Check BIAS:

TP9	11V ±10%
TP10	11V ±10%

9. Insert **1KHz 77mV RMS SINE WAVE** into input and connect to 16Ω load.
Set oscilloscope to 5 volts/division & Switch to **CHANNEL 1.**
Set **GAIN** and **MASTER** controls 5 (on both Channels).
(When adjusting controls check scope for clean operation of pots throughout range).
Turn **BASS** control to maximum. Signal should be clean ~9v p/p. Return to minimum.
Turn **MIDDLE** control to maximum. Signal slightly clipped ~25v p/p. Return to min.

Turn **TREBLE** control to maximum. Signal should be cleanish ~22v p/p.
Turn **TREBLE** control down until signal is sinusoidal (clean sine wave)
Turn **MASTER** control up to clip.
Check output power is approx **21vrms @16Ω (~30W RMS)**

Switch to **CHANNEL 2** and repeat the above test.

10. Now place the amplifier on the soak test station and run at **1 KHz** so output waveform just clips for 2 hours, (on either channel). Check that the waveform clips evenly top & bottom.

11. Remove amplifier from soak test and check the following:

With a No.1 point posidrive; check that every M3 bolt is tight.
Check all other nuts & bolts are tight and not damaged, (chewed up).
Check all fuses are the correct type & value.
Check all valves are the correct type.
Fit screening cans over pre-amp valves and turn 90 degrees.
With a multimeter, check continuity between all valve cans and chassis earth.

12. Plug back into test bench, connect **16Ω load** and check the power output is still correct:-

~21Vrms @16Ω (~30W RMS)

13. Switch to **STANDBY**; connect to **8Ω load** & check output power

~15Vrms @8Ω (~30W RMS)

Switch amplifier OFF, slide voltage selector into alternate position and set variac for the alternate voltage. Switch ON again and check output power is the same at this voltage.
Now switch OFF, switch back to destination voltage and turn ON again.

14. Insert **1KHz 77mV RMS SINE WAVE** into input and connect to **16Ω load**.

Set oscilloscope to 5 volts/division.

Switch to **CHANNEL 1**

Set **GAIN** and **MASTER** controls 5 (on both Channels).

(When adjusting controls check scope for clean operation of pots throughout range.)

Turn **BASS** control to maximum. Signal should be clean ~9v p/p. Return to minimum.

Turn **MIDDLE** control to maximum. Signal slightly clipped ~25v p/p. Return to min.

Turn **TREBLE** control to maximum. Signal should be cleanish ~22v p/p.

Turn **TREBLE** control down until signal is sinusoidal (clean sine wave)

Turn **MASTER** control up to clip.

Check output power is approx **21vrms @16Ω (~30W RMS)**

Switch to **STANDBY** and connect to an **8Ω load**.

Switch **CHANNEL 2** and repeat the above test.

15. Insert footswitch into **Channel Footswitch** socket on rear. Check that this switches the channel.

16. Turn **MASTER** control to minimum and switch unit to **STANDBY**.

Connect output to appropriate 12" speaker cabinet of suitable impedance.

Insert guitar or other appropriate audio signal to **INPUT**.

Aurally test correct functionality of controls and tonality of each channel.

Check smooth operation of potentiometers and quiet switching of functions.

Check for any excessive hum or noise.

Gently tap each valve with a screwdriver to check for microphony and instability.

Listen carefully for any noisy, scratchy or crackling pots and replace where necessary. Don't try to clean them as this is only a temporary fix.

If a POT sounds crackly or scratchy, it may have a small DC voltage on one or more of the pins. Before replacing it, measure each pin with respect to ground using a multimeter on the 200mV DC range. There should be no DC at all on the POTs.

Turn all controls to mid positions, switch unit first to **STANDBY** and then **OFF**.

FLASH TEST

Attach test lead from Flash Tester to unit via adapted mains input lead with croc clip to Yellow/Green, (earth).

Primary Test:

Place gun on Brown lead connection from mains input socket then bring voltage up to 1.5KV. If Red light shows on the tester, the unit has failed. If not, the unit has passed.

Test is complete.

Relevant changenotes (ECOs):

ECO0001	15.07.2002	AD30TC & HTC O-PCB-AD30TC-M PC00134x1	C23 changed from 1000uF 16V to 4700uF 16V	Better smoothing of supply for channel switching
ECO0005	18.07.2002	AD30TC & HTC O-PCB-AD30TC-M PC00134x1	C23 changed from 1000uF 16V to 4700uF 10V (see ECO0001 16V not Available)	Better smoothing of supply for channel switching
ECO0013	29.06.2004	AD140 & AD30HTC/TC	Add 680pF 16VER to AD140, (C28) 7 to AD30TC, (C26)	Relay switching reliability, (see ECO for details)
ECO0024	17.01.2006	All Orange amplifiers	Remove all M3 flat washers from internal PCB fixings except earth point	To reduce the risk of washer shorting on valve pins
	17.01.2006	All Orange amplifiers	Dress OP wires as near as poss. to rear of chassis. Do not tie to ribbon cables	To reduce hum & pickup
ECO0027	27.02.2006	All Orange amplifiers	Reduce number of cable ties to a minimum	To reduce stress on wiring looms.
	27.02.2006	All Orange amplifiers with ribbon cables	Do not run any cables under the ribbon cables	To stop stress pulling ribbon cables off their headers
	27.02.2006	All Orange amplifiers	Do not lengthen any OP TX wires. Return any to supplier if they are too short	Approvals requirement
	27.02.2006	All Orange amplifiers	Reduce hot glue use to IEC inlet & 3Way IDC connectors	To aid servicing, (hot glue is difficult to remove)
ECO0031	20.06.2006	All Orange PCBs with 2-Part fuse holders	All 2-part fuse holders to be tensioned before fuses fitted in Tunisia & UK	Problems in the field with loose fuses: Amp failure
ECO0034	27.09.2006	All PCBs that have POTs inserted	Only solder POTs on underside of PCB, (Leg side)	To reduce possible heat damage to POT eyelets
ECO0049	21.07.2008	All Orange chassis	Add 4.4mm masked hole inside chassis on earth tabs side 20mm from open end	To enable the use of M4 round crimp tabs for earthing
	21.07.2008	All Orange Amplifiers	All earth connections to have M4 round tabs fitted & bolted into new side hole	More elegant & serviceable earthing for amplifiers
ECO0050	02.07.2008	All Orange PCBs with star earth fixing bolt	Use Loctite 222 Threadlocker on star-earth fixing point M3x6 PPZ bolt	To stop them coming loose in the field
ECO0052	02.07.2008	All Orange PCBs with star earth fixing bolt	Supersedes EC0051. Use M3x8PP Zinc both sides of Hex spacer for star-earth fixing	To stop them coming loose in the field
ECO0057	17.09.2008	All amps that use one-piece valve cans	Supersedes EC0046. Amp assembly to remove paint from inside chassis Valve Cans	Using drill wire brush. Easier than masking holes

Orange AD30HTC/AD30TC Fuses & Valves

IEC Socket	230/220v	120/100v				
	T2A	T4A				
CHASSIS	HT1	HT2				
	T500mA	T500mA				
PCB's	FS1	FS2				
ORA-PC134	T4A	T6.3mA				

	V1 & V2	V3 & V4	V5, V6, V7, V8	V9
AD30HTC/TC	E83CC/12AX7 x2 Low Noise	ECC83/12AX7 x2 Standard	EL84 x4	GZ34 x1