Operators & Service Manual

XL4

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DECLARATION OF CONFORMITY

The Directive Covered by this Declaration

89/336/EEC Electromagnetic Compatibility Directive, amended by 92/31/EEC & 93/68/EEC

Equipment Type	Product Name
Audio Mixing Console	XL4

The Basis on which Conformity is being Declared

The Products named above comply with the requirements of the above EU directives by meeting the following standards:

EN 55013: 1990
EN 50082: 1992

Signed: .... Alex Cooper
Authority: Project Leader
Date: 28th November, 1995

Attention!

The attention of the specifier, purchaser, installer or user is drawn to special limitations of use which must be observed when these products are taken into service to maintain compliance with the above directives. Details of these special measures and limitations to use are available on request and are also contained in product manuals.

ATTENTION!

The following special limitations apply to the console and must be observed in order to maintain safety and electromagnetic compatibility performance:

POWER CONNECTION
The console should only be operated with the power supply connected to ground via its mains supply connector.

CONTROL CONNECTIONS
The console should only be operated with high quality screened control cables. All connector shells should be of metal construction so that they provide a screen when they are plugged into the console. All DEE connector shells should be connected to the cable screen. All XLR and DIN connectors should have pin 1 connected to the cable screen.

AUDIO CONNECTIONS
The console should only be operated with high quality screened twisted pair audio cables. All connector shells should be of metal construction so that they provide a screen when they are plugged into the console. All JACK connector shells should be connected to the cable screen. All XLR connectors should have pin 1 connected to the cable screen.

ELECTRIC FIELDS
If the console is operated in an electromagnetic field that is amplitude modulated by an audio frequency signal, the signal to noise ratio may be degraded. Degradation of up to 60dB may be experienced under extreme conditions (3V/m, 90% modulation).

CONTENTS

XL402 Input Pod.

1. The MIC control gives continuous adjustment of the mic amp gain from + 15dB to + 70dB

2. The PAD switch gives 20dB of attenuation to the mic signal and will allow the connection of high output microphones or line level signals. If the mic amp is transformer coupled (option) the pad greatly reduces the risk of saturation at very low frequencies.

3. The 48V switch connects 48 volt phantom power to the mic input suitable for a condenser microphone or DI box.

4. The LINE control gives continuous adjustment of the line amp gain from - 20dB to + 20dB

5. The LINE switch connects the line input to the signal path and disconnects the mic amplifier. This switch is under automation control.

6. The PHASE switch activates a 180 degrees phase change on both the mic and line inputs. This switch is under automation control.

7. The LO PASS filter control acts on the mic input only and is continuously adjustable from 1K to 40K. When the filter is set to 40K there is no loss at 20K.

8. The HI PASS filter control acts on the mic input only and is continuously adjustable from 10Hz to 400Hz. When the filter is set to 10Hz there is no loss at 20Hz.

9. The METER monitors the peak signal level of the input channel pre fader. When the GLOBAL METER CHANGE OVER switch on the COMMS module is activated the meter monitors the mic amp or line amp output (which ever is in use).

XL401 Input Module.

1. The DIRECT output control gives continuous adjustment of the direct output level from + 10dB to off. The output is derived from the input channel post fader signal.

2. The PRE FADE switch re configures the direct output to derive signal from the input channel pre fader.

3. The PRE INS & EQ switch re configures the direct output to derive signal from the input channel pre insert and equaliser.

4. The TREBLE (dual concentric top) control gives continuous adjustment of boost and cut from + 15dB to - 15dB with a 0dB centre detent.

5. The treble WIDTH (dual concentric bottom) control gives continuous adjustment of bandwidth from 0.1 to 2 octaves with a 0.5 octave centre detent. This only operates when the BELL switch is activated.

6. The treble FREQ control gives continuous adjustment of the frequency range that the treble equaliser acts on from 1K to 20K.

7. The treble BELL switch converts the treble equaliser from traditional MIDAS shelving response to full parametric operation.

8. The HI MID (dual concentric top) control gives continuous adjustment of boost and cut from + 15dB to - 15dB with a 0dB centre detent.

9. The hi mid WIDTH (dual concentric bottom) control gives continuous adjustment of bandwidth from 0.1 to 2 octaves with a 0.5 octave centre detent.

10. The hi mid FREQ control gives continuous adjustment of the frequency range that the hi mid equaliser acts on from 400Hz to 8K.

11. The EQ switch connects the equaliser in the input channel signal path and is under automation control.

12. The LO MID (dual concentric top) control gives continuous adjustment of boost and cut from + 15dB to - 15dB with a 0dB centre detent.

13. The lo mid WIDTH (dual concentric bottom) control gives continuous adjustment of bandwidth from 0.1 to 2 octaves with a 0.5 octave centre detent.

14. The lo mid FREQ control gives continuous adjustment of the frequency range that the lo mid equaliser acts on from 100Hz to 2K.

14. The INSERT PRE EQ arranges the input channel signal to pass through the insert point before the equaliser when activated and after the insert point when not activated.

15. The BASS (dual concentric top) control gives continuous adjustment of boost and cut from + 15dB to - 15dB with a 0dB centre detent.

16. The bass WIDTH (dual concentric bottom) control gives continuous adjustment of bandwidth from 0.1 to 2 octaves with a 0.5 octave centre detent. This only operates when the BELL switch is activated.

17. The bass FREQ control gives continuous adjustment of the frequency range that the bass equaliser acts on from 20Hz to 400Hz.

18. The bass BELL switch converts the bass equaliser from traditional MIDAS shelving response to full parametric operation.

19. The mono AUX controls (1 to 16) give continuous adjustment of the level sent from the input channel to the aux busses. The level adjustment is from + 6dB to off.

20. The mono aux ON switches connect signals from the input channel to the mono aux busses and are under automation control.

21. The mono aux PRE switches change the signal sent to the mono aux busses from post fader to pre fader.

22. The ST AUX controls (1 to 8) give continuous adjustment of the level sent from the input channel (post pan) to the stereo aux busses. The level adjustment is from + 6dB to off.

23. The stereo aux ON switches connect signals from the input channel to the stereo aux busses and are under automation control.

24. The stereo aux PRE switches change the signal sent to the stereo aux busses from post fader to pre fader whilst retaining the post pan stereo image.

25. The PAN control places the input channel within a stereo mix and has a constant power law i.e. - 3dB at the centre position.

26. The INS switch connects the input insert return signal to the input channel before or after the equaliser (see insert pre eq switch “14”) and is under automation control.

27. The ST switch connects the input channel post fader signal to the stereo master buss via the pan control and is under automation control.

28. The MUTE switch mutes the input channel at all points except the insert send and pre insert / eq direct output. This switch is under automation and auto mute group control.

XL403 Input VCA Fader.

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1. The SOLO switch sends the input channel signal to the PFL mono and AFL stereo busses. If the switch is pressed for a short time it will latch on or off, but, if it is held on for more than 1 second the latching is disabled and when the switch is released the channel solo will turn off.

2. The ISOLATE switch disconnects the channel from the automation screen recall. Screen storage is still active.

3. The SAFE switch disconnects the input channel mute from the 8 auto mute busses.

4. The GROUP ASSIGN SWITCHES 1 to 10 are under automation control and perform 3 major functions:-

i. They are used to connect the input channel post fader signal to the 16 AUDIO groups via the pan control.

ii. They are used to assign the input channel to the 10 VCA sub groups.

iii. They are used to assign the input channel to the 8 auto MUTE groups.

The function of these switches is globally selected by pressing the large AUDIO, VCA or MUTE switches on the AUTOMATION CENTRAL CONTROL panel. A fourth large switch LOCK is used to disable all the input channel group assign switches throughout the console so as to avoid accidental operation. It is still possible to view the switch status of all three group types when in this mode.

5. The VCA INPUT fader gives continuous adjustment of the input channel level from + 10dB to off.

XL412 Group Pod.

1. The AUX switch changes the function of the left and right meters so that they monitor the aux send outputs in place of the audio group outputs.

2. The RETURN switch changes the function of the left and right meters so that they monitor the post fader line return signals. If the AUX switch is not activated the meters return to monitoring the audio group outputs regardless of the RETURN switch position.

3. The METERS monitor the peak signal level of the group, aux or returns as described above but when the GLOBAL METER CHANGE OVER switch on the COMMS module is activated the meters monitor the group bus, aux bus or return input amplifiers (which ever is selected).

XL414 Group Module.

1. The AUX SEND controls give continuous adjustment of the mono aux bus output levels from + 10dB to off.

2. The aux send MUTE switches mute the aux bus outputs.

3. The aux send SOLO switches send mono aux bus signals to the PFL and AFL busses. If a switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

4. The FADER CHANGE OVER switches swap the mono aux busses with the audio group busses so that the console can be used for monitor applications.

5. The VCA GROUP switches assign the line returns to the 10 vca sub groups.

6. The TREBLE control gives continuous adjustment of boost and cut from +15dB to -15dB with a centre detent. The frequency is fixed at 10kHz.

7. The BASS control gives continuous adjustment of boost and cut from +15dB to -15dB with a centre detent. The frequency is fixed at 100Hz.

8. The 48V switch connects 48 Volt phantom power to the mic / line inputs as required for condeneser mics etc.

9. The LEVEL controls give continuous adjustment of the line return levels from + 10dB to off.

10. The line return PAN controls place the line return signals within the stereo master mix and have a constant power law i.e. -3dB at the centre position.

11. The line return MUTE switches mute the line return signals and are under automation control.

12. The line return SOLO switches send the line return signals to the mono PFL and stereo AFL

busses. If a switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

12. The SUB switches disconnect the line returns from the stereo master buss and route the signals to the audio sub groups directly below without passing through the pan control.

13. The GRAND MASTER VCA switches assign the audio sub groups to the 2 grand master vca sub groups.

14. The AUTO MUTE GROUP switches assign the audio sub groups to the 8 auto mute groups.

15. The SAFE switches disconnect the audio sub group mutes from the auto mute busses.

16. The TALK switches connect the audio sub groups to the COMMS module. When the TALK TO GROUPS switch on the COMMS module is activated it is then able to route its oscillator, pink noise, external input, talk mic or comms mic to the audio sub groups.

17. The INS switches connect the group insert return signals to the audio sub groups.

18. The ST switches connect the post fader audio sub group signals to the stereo master bus via the pan controls.

19. The group PAN controls place the audio groups within the stereo master mix and have a constant power law i.e. -3dB at the centre position.

20. The group MUTE switches mute the audio groups at all points except the insert send and are under automation and automute group control.

21. The group SOLO switches send the group input signals to the mono PFL and stereo AFL busses. If a switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

22. The GROUP FADERS give continuous adjustment of the audio sub group levels from + 10dB to off.

XL413 Group VCA Fader.

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1. The vca SOLO switches are used to monitor VCA sub groups by creating a corresponding AUDIO sub group on the stereo AFL busses. All input channels and line returns that are assigned to a specific vca sub group will be summed onto the solo busses when that vca solo is active.

Note i. If large numbers of inputs are assigned to one vca sub group, there will be a higher than usual signal level sent to the solo busses when the vca solo is active (+ 6 to + 10 dB approx.).

Note ii. When vca solo switches are active the PFL buss also receives signals from the vca sub group inputs but it will NOT be a true representation of the relative levels within the vca sub group. This feature is however useful as it allows confirmation of signal present and signal quality when the vca fader is down or the vca sub group is muted. It is therefore important to know the status of the PFL MONITOR switch on the COMMS module before using the vca solo switches.
Note iii. If a vca solo switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

2. The ISOlate switches disconnect the vca sub group faders and mutes from automation screen recall. Screen storage is still active.

3. The vca MUTE switches mute any post fader input channel signals which are assigned to the corresponding vca sub group.

4. The VCA GROUP faders are motorised and under automation control. They give continuous adjustment of the vca sub group gains from +10dB to off.

XL422 Master Pod.

1. The METERS monitor the peak signal levels of the stereo master left and right outputs. When the GLOBAL METER CHANGE OVER switch on the COMMS module is activated the meters monitor the master left and right bus amplifiers.

XL421 Master Module.

1. The RECORD controls (1 and 2) give continuous adjustment of the stereo record outputs from + 10dB to off. The record signals are derived from the pre insert master left and right signals.

2. The record METERS monitor the peak signal level of the left and right record outputs (which ever is the heighest).

3. The record MUTE switches mute the record outputs.

4. The MUTE ALL switch effectively switches the console off by muting all outputs.

5. The SOLO IN PLACE switch disconnects the three pre insert master signals (left, mono and right) and replaces them with the stereo AFL solo busses. This does not effect the master to matrix feeds which means the matrix mixes can be “solo in placed” on the master outputs.

6. The mono INS switch connects the mono insert return signal to the mono mix.

7. The VCA switch connects the mono vca fader to the stereo master fader so that the mono output tracks any changes of the stereo master fader.

8. The mono SOLO switch sends the mono master signal to the PFL and AFL solo busses. If the switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off. The master mix signal can not be sent to the solo busses while any other solo is active.

9. The mono MUTE switch mutes the mono output but not the mono insert send. This switch is under automation control.

10. The mono FADER gives continuous adjustment of the mono output level from + 10dB to off.

11. The mono METER monitors the peak level of the post fader mono signal. When the GLOBAL METER CHANGE OVER switch on the COMMS module is activated the meter monitors the mono bus summing amplifier output.

12. The AUX I/P MUTE mutes every aux line return input on the GROUP modules.

13. The INS LEFT and RIGHT switches connect the master left and right insert return signals to the stereo master mix.

14. MATRIX SEND PRE. Feeds to the matrix modules from the stereo busses are post fader as a default. When the MATRIX SEND PRE is active, the feed changes to pre fader and pre insert.

15. The BALANCE (pan) control gives continuous and reciprocal adjustment of the stereo left and right signal levels by + 3dB to off. This allows fine adjustment of the left, right power levels and imaging.

16. The stereo master MUTE switches mute the stereo master outputs but not the insert sends. These switches are under automation control.

17. The stereo master SOLO switches send stereo master signals to the PFL mono and AFL stereo busses. If the switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off. The master mix signal can not be sent to the solo busses while any other solo is active. This means that they can be left on to provide a stereo master signal in the headphones which will be overridden if any other solo is activated on the console.

18. The stereo MASTER FADER gives continuous adjustment of the stereo master mix level from + 10dB to off.

XL413 Grand Master A VCA Fader.

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1. The grand master A vca SOLO switch is used to monitor the grand master A VCA sub group by creating a corresponding AUDIO sub group on the stereo AFL busses. All AUDIO sub groups that are assigned to grand master vca A will be summed onto the solo busses when the vca solo is active.

Note i. When grand master vca A solo switch is active the PFL buss also receives signals but they are NOT a true representation of the relative levels within the grand master vca sub group. This feature is however useful as it allows confirmation of signal present and signal quality when the grand master vca fader is down or muted. It is therefore important to know the status of the PFL MONITOR switch on the COMMS module before using the grand master vca solo switches.

Note ii. If a grand master vca solo switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

2. The ISOlate A switch disconnects the grand master vca sub group faders and mutes from automation screen recall. Screen storage is still active.

3. The vca MUTE A switch mutes any AUDIO group post fader signals which are assigned to the grand master A vca sub group.

4. The grand master A VCA GROUP fader is motorised and under automation control. It gives continuous adjustment of the grand master vca sub group gain from +10dB to off.

XL422 Comms Pod.

1. The METERS monitor the peak signal levels of the stereo AFL left and right solo busses or the PFL bus and local output level. The change over is automatic as part of the PFL MONITOR switch on the COMMS module.

XL431 Comms Module.

1. The CALL switch and indicator has two functions:-

    i. It illuminates when an incoming “clearcom” call is expected.

    ii. It fires a DC pulse when pressed to signal “clearcom” devices (by illuminating their call lamps) that an outgoing call is to be made.

2. The OSC switch connects the oscillator to the talk system.

3. The EXTERNAL ON switch connects the external talk input and output to the talk system.

4. The PINK noise switch connects pink noise to the talk system.

5. The FREQ control gives continuous adjustment of the oscillator frequency from 100Hz to 10K.

6. The talk LEVEL control gives continuous adjustment of all the talk inputs except the talk mic and has a range from + 6dB to off.

7. The TALK TO AUXES switch sends the talk system signals to ALL the aux busses.

8. The TALK TO GROUPS switch sends the talk system signals to any group buss which has its GROUP module TALK switch active.

9. The TALK TO MATRIX switch sends the talk system signals to any matrix buss which has its MATRIX module TALK switch active.

10. The TALK TO MONO switch sends the talk system signals to the mono master bus.

11. The TALK TO LEFT switch sends the talk system signals to the left master bus.

12. The TALK TO RIGHT switch sends the talk system signals to the right master bus.

13. The COMMS ON switch sends the comms headset mic amplifier signal to the comms output / input connector.

14. The LINK switch connects the talk system into the comms system so that talk mic, headphones and local output can send and receive (respectively) “clearcom” signals as well as the headset.

15. The COMMS control gives continuous adjustment of the “clearcom” signal levels sent to the headset, headphones and local output. The level adjustment is from + 6dB to off.

16. The TALK XLR socket accepts balanced 150 Ohm microphone signals from - 50dBu to - 20dBu and uses an auto ranging gain system to bring the level to nominal 0dBu line level.

17. The TALK control gives continuous adjustment of the talk mic amplifier signal from + 6dB to off. The talk control does not act on signals sent to the comms system in LINK mode.

18. The TALK switch activates the talk mic on the talk system and dims the local outputs by 20dB to stop howl round. When in LINK mode the COMMS ON switch activates the talk mic on the comms system and the side tone cancel circuit stops howl round.

19. The AUTO MUTE GROUP MASTER switches (1 to 8) activate the mute circuits on any appropriately mute group assigned input channel or audio group.

20. The SOLO ADD MODE switch allows multiple channel access to the solo busses. When the solo add mode is off the action of pressing a solo switch will cancel any other active solo except for the master solo switches where the cancelling effect is only temporary (see XL421 Master Module).

21. The GLOBAL METER CHANGE OVER switch changes the operation of every meter on the console except the comms meters and the record meters. The “normal” meter operation is to monitor pre fader on input channels and post fader on all other signals. When the global meter change over is active the meters change to monitor input amplifiers or bus amplifiers (as appropriate) on all signals.

22. The PFL MONITOR switch sends the mono PFL solo bus signal to the headphones and local outputs in place of the stereo AFL solo bus signals.

23. The local output LEVEL control gives continuous adjustment of the local output level from + 10dB to off.

24. The FADER CHANGE OVER switch swaps the local output level control and mute with the headphone fader and mute.

25. The local output MUTE switch mutes the local outputs.

26. The HEADPHONE MUTE switch mutes the headphone outputs.

28. The SOLO ON / CLEAR switch and indicator has two functions:-

i. It illuminates when any solo switch (except a master solo switch) is active.

ii. When pressed it clears any active solo switches (except master solo switches).

29. The HEADPHONE fader gives continuous adjustment of the headphone level from + 10dB to off.

XL413 Grand Master B VCA Fader.

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1. The grand master B vca SOLO switch is used to monitor the grand master B VCA sub group by creating a corresponding AUDIO sub group on the stereo AFL busses. All AUDIO sub groups

that are assigned to grand master vca B will be summed onto the solo busses when the vca solo is active.

Note i. When grand master vca B solo switch is active the PFL buss also receives signals but they are NOT a true representation of the relative levels within the grand master vca sub group. This feature is however useful as it allows confirmation of signal present and signal quality when the grand master vca fader is down or muted. It is therefore important to know the status of the PFL MONITOR switch on the COMMS module before using the grand master vca solo switches.

Note ii. If a grand master vca solo switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

2. The ISOlate B switch disconnects the grand master vca B sub group faders and mutes from automation screen recall. Screen storage is still active.

3. The vca MUTE B switch mutes any AUDIO group post fader signals which are assigned to the grand master B vca sub group.

4. The grand master B VCA GROUP fader is motorised and under automation control. It gives continuous adjustment of the grand master vca sub group gain from +10dB to off.

XL422 Matrix Pod.

1. The CHANGE OVER switches change the function of the left and right meters so that they monitor the stereo aux send outputs in place of the matrix outputs.

2. The METERS monitor the peak signal level of the matrix or stereo aux outputs as described above but when the GLOBAL METER CHANGE OVER switch on the COMMS module is activated the meters monitor the matrix bus or stereo aux bus amplifiers (which ever is selected).

XL441 Matrix Module.

1. The STEREO AUX MASTER control gives continuous adjustment of the stereo aux output level from + 10dB to off.

2. The stereo aux MUTE switch mutes the stereo aux outputs.

3. The stereo aux SOLO switch sends stereo aux signals to the PFL mono and AFL stereo busses. If the switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

4. The MTX switch sends the pre fader stereo aux bus signals to the matrix mix directly below so that the console can be used for monitor applications.

5. The MIX controls (1 to 16) give continuous adjustment of the audio sub group levels sent to the matrix mixes from + 6dB to off. If the FADER CHANGE OVER switch on the GROUP module is active the aux bus will route to the matrix mix in place of the audio sub group.

6. The GLOBAL PRE ON switch changes the audio sub group signals that are routed via the mix

controls to the matrix from post fader to pre fader.

7. The MASTER LEFT controls give continuous adjustment of the master left signals that are sent to the matrix mixes. The adjustment is from + 6dB to off.

8. The MASTER RIGHT controls give continuous adjustment master right signals that are sent to the matrix mixes. The adjustment is from + 6dB to off.

9. The TALK switches connect the matrix busses to the COMMS module. When the TALK TO MATRIX switch on the COMMS module is activated it is then able to route its oscillator, pink noise, external input, talk mic or comms mic to the matrix mix.

10. The INS switches connect the matrix insert return signals to the matrix mixes.

11. The matrix MUTE switches mute the matrix outputs but not the insert sends. These switches are under automation control.

12. The matrix SOLO switches send signals to the PFL mono and AFL stereo busses. If the switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second, the latching is disabled and when the switch is released, the solo will turn off. These solo switches cannot be operated if the console is being used in SOLO IN PLACE mode. This is a safety feature which prevents matrix output signals from being routed back to their inputs via the master matrix feed.

13. The MATRIX FADERS give continuous adjustment of the matrix levels from + 10dB to off.

XL405 Stereo Input Pod.

1. The MIC control gives continuous adjustment of left and right mic amp gains from +15dB to +70dB.

2. The PAD switch gives 25dB of attenuation to the mic signals and will allow the connection of high output microphones or line signals. If the mic amps are transformer coupled (option) the pad greatly reduces the risk of saturation at very low frequencies.

3. The 48V switch connects 48 volt phantom power to both mic inputs as required for condenser microphones etc.

4. The METERS monitors the peak signal level of the left and right input channels pre fader. When the GLOBAL METER CHANGE OVER switch on the COMMS module is activated the meters monitor the left and right mic/line amp outputs.

5. The left PHASE switch activates a 180 degrees phase change on the left mic/line input.

6. The right PHASE switch activates a 180 degrees phase change on the right mic/line input.

7. The BALANCE control gives continuous and reciprocal adjustment of the stereo left and right signal levels by +10dB to -10dB. This allows fine adjustment of the left and right signal levels and imaging.

8. The HI PASS switch connects the high pass filter into the left and right signal path.

9. The HI PASS filter control is continuously adjustable from 10Hz to 400Hz.

10. The stereo input pod provides a left and right DIRECT OUTPUT which can be internally linked as pre or post insert/eq.

XL404 Stereo Input Module.

1. The TREBLE control gives continuous adjustment of left and right shelving filters boost and cut from +15dB to -15dB with a 0dB centre detent.

2. The treble FREQ control gives continuous adjustment of the frequency range that the treble equalisers act on from 2K to 20K.

3. The HI MID control gives continuous adjustment of left and right boost and cut from +15dB to -15dB with a 0dB centre detent.

4. The hi mid FREQ control gives continuous adjustment of the frequency range that the hi mid equalisers act on from 400Hz to 8K.

5. The hi mid WIDTH control gives continuous adjustment of the filter bandwidths from 0.3 to 2 octaves with 1 octave being the centre position.

6. The LO MID control gives continuous adjustment of left and right boost and cut from +15dB to -15dB with a 0dB centre detent.

7. The lo mid FREQ control gives continuous adjustment of the frequency range that the lo mid equalisers act on from 100Hz to 2K.

8. The lo mid WIDTH control gives continuous adjustment of the filter bandwidths from 0.3 to 2 octaves with 1 octave being the centre position.

9. The EQ switch connects the left and right equalisers in the input channel signal paths and is under automation control.

10. The BASS control gives continuous adjustment of the left and right shelving filters boost and cut from +15dB to -15dB with a 0dB centre detent.

11. The bass FREQ control gives continuous adjustment of the frequency range that the bass equalisers act on from 20Hz to 200Hz.

12. The mono AUX controls (1 to 16) give continuous adjustment of the level sent from the input channel to the aux busses. The signal is a mono sum of the left and right signals and the level adjustment is from + 6dB to off.

13. The mono aux ON switches connect signals from the input channel to the mono aux busses and are under automation control.

14. The mono aux PRE switches change the signal sent to the mono aux busses from post fader to pre fader.

15. The ST AUX controls (1 to 8) give continuous adjustment of the level sent from the input channel (post pan) to the stereo aux busses. The level adjustment is from + 6dB to off.

16. The stereo aux ON switches connect signals from the input channel to the stereo aux busses and are under automation control.

17. The stereo aux PRE switches change the signal sent to the stereo aux busses from post fader to pre fader whilst retaining the post pan stereo image.

18. The left and right PAN controls are used to place the input channel signals within a stereo mix. As well as image placement, the controls can also adjust the image width from stereo through mono to reverse stereo (left and right crossed over). The controls have a constant power law i.e. -3dB at the centre position.

19. The INS switch connects the left and right input insert return signals to the input channel and is under automation control.

20. The ST switch connects the input channel post fader signals to the stereo master buss via the pan controls and is under automation control.

21. The MUTE switch mutes the input channel at all points except the insert send and pre insert/eq direct output. This switch is under automation and auto mute group control.

1. The AUX SEND controls give continuous adjustment of the mono aux bus output levels from +10dB to off.

2. The aux send MUTE switches mute the aux bus outputs.

3. The aux send SOLO switches send mono aux bus signals to the PFL and AFL busses. If a switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

4. The FADER CHANGE OVER switches swap the mono aux busses with the audio group busses so that the console can be used for monitor applications.

5. The VCA GROUP switches assign the mic/line returns to the 10 vca sub groups.

6. The TREBLE controls give continuous adjustment of boost and cut from +15dB to -15dB with a centre detent. The frequency is fixed at 10kHz.

7. The BASS controls give continuous adjustment of boost and cut from +15dB to -15dB with a centre detent. The frequency is fixed at 100Hz.

8. The GAIN controls give continuous adjustment of the mic/line return gains from +50dB to -30dB. The special input circuits maintain full headroom from mic level to line level without the use of a pad.

9. The mic/line return PAN controls place the return signals within the stereo master mix and have a constant power law i.e. -3dB at the centre position.

10. The mic/line return MUTE switches mute the return signals and are under automation control.

11. The mic/line return SOLO switches send the return signals to the mono PFL and stereo AFL busses. If a switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

12. The SUB switches disconnect the line returns from the stereo master buss and route the signals to the audio sub groups directly below without passing through the pan control.

13. The GRAND MASTER VCA switches assign the audio sub groups to the 2 grand master vca sub groups.

14. The AUTO MUTE GROUP switches assign the audio sub groups to the 8 auto mute groups.

15. The SAFE switches disconnect the audio sub group mutes from the auto mute busses.

16. The TALK switches connect the audio sub groups to the COMMS module. When the TALK TO GROUPS switch on the COMMS module is activated it is then able to route its oscillator, pink noise, external input, talk mic or comms mic to the audio sub groups.

17. The INS switches connect the group insert return signals to the audio sub groups.

18. The ST switches connect the post fader audio sub group signals to the stereo master bus via the pan controls.

19. The group PAN controls place the audio groups within the stereo master mix and have a constant power law i.e. -3dB at the centre position.

20. The group MUTE switches mute the audio groups at all points except the insert send and are under automation and automute group control.

21. The group SOLO switches send the group input signals to the mono PFL and stereo AFL busses. If a switch is pressed for a short time it will latch on or off, but if it is held on for more than 1 second the latching is disabled and when the switch is released the solo will turn off.

22. The GROUP FADERS give continuous adjustment of the audio sub group levels from + 10dB to off.

XL4 CIRCUIT DESCRIPTION

1. Earthing System.

The XL4 uses a multiple grounding system to control the interference effects between its internal digital, analogue audio, analogue fader power and the external systems it is intended to interface with.

The grounds are marked on the schematics as follows:-

0VA Analogue zero volts reference which is used for all internal audio circuits, the 48 volt phantom and twin 18 volt power rails.

0VC Chassis zero volts which is a SAFETY connection to EARTH for the chassis and also provides a Faraday screen for the console circuits.

0VD Digital zero volts reference which is used for all the internal digital circuits and the 5 volt power rail.

0VF Fader zero volts reference which is used for all fader power circuits, the headphone amplifier and the twin 15 volt power rails.

0VS Screen zero volts reference which is connected to all audio input and output sockets to provide a ground for the cable screens and to provide a return path for the 48 volt phantom on microphone inputs.

0VA, 0VC, 0VD, 0VF and 0VS are electronically connected at defined points within the console so as to eliminate circulating currents and interference. Any additional connections between these points may cause noise problems or digital system failure. 0VA, 0VC, 0VD and 0VS are connected together at the power supply connector distribution board at the back of the console. 0VD and 0VF are connected together at the power distribution board and other points within the fader tray.

To ensure safety the mains earth must be connected to the console power supply at all times.

All cables used to connect audio signals or control signals to the console must be terminated with metal bodied (i.e. screened) connector shells. All Dee type control cables must be high quality sheilded types with the shield connected to the connector shell. All MIDI cables must be high quality shielded types with the shield connected to pin 1. All audio cables must be high quality sheilded twisted pair types with shield connected to pin 1. Any other cable type or configuration may result in degraded performance due to electromagnetic interference.

2. Power Supply.

The XL4 has an external 3U 19” rack mounted power supply with an auto ranging input for 115 volt or 230 volt nominal operation. It generates six rails to power the console as follows:-

+18 volts at 20 amps referenced to 0VA

- 18 volts at 20 amps	referenced to 0VA
+ 48 volts at 0.7 amps	referenced to 0VA
+15 volts at 10 amps	referenced to 0VF
- 15 volts at 10 amps	referenced to 0VF
+ 5 volts at 10 amps	referenced to 0VD

All rails in the power supply are floating until it is connected to the console which connects the chassis and signal zero volt references as described previously. The power supply provides a SAFETY connection to EARTH for the console via its mains connection.

THE POWER SUPPLY SHOULD NEVER BE OPERATED WITH THE MAINS EARTH DISCONNECTED.

Please note that the power supply contains LETHAL VOLTAGES greatly in excess of the mains voltage and that its rails can produce extremely large currents which could burn out equipment and wiring if shorted. All testing and servicing should ONLY be carried out by qualified engineers.

All power supply rails are generated by two switch mode blocks inside the case. There are no user serviceable parts within these; if a failure is traced to one of these blocks it should be replaced. No attempt should be made to repair a switch mode block. Repair is only possible by returning the block to MIDAS ENGLAND.

All rails are filtered to remove switching noise and connected to the console via diodes. This allows two power supplies to be connected in parallel to one console; in the event that one supply fails the other will continue to operate normally.

The circuit configuration is similar for all rails except for the polarity of some components. The switch mode block output is first shunted by a differential filter capacitor network and then fed to a common mode choke. The choke feeds a further capacitor network which filters common mode noise to the chassis. This is followed by a differential choke, a smoothing capacitor network and the power diode. The 48 volt supply does not use a differential choke; a resistor is used in place of this part.

The power supply monitors the voltage on the mains supply at all times. If the mains is interrupted the power supply gives the console automation system advanced warning that the rails will collapse. This ensures that the automation is in reset before the 5 volt rail has become to low to operate the system correctly. The mains is rectified by diodes D11, D12, D13 and D14 which feed opto-isolator IC1. The output is smoothed by C87 and inverted by invertor IC2. Resistor R8 and capacitor C88 provide a delayed turn on and diode D15 ensures fast turn off. The signal is again inverted by the remaining sections of IC2 which are paralleled to provide high drive capability. The power on line is fed by diodes D16 to D20 and pulled logic low by resistor R9; this allows for power supplies to be connected in parallel.

3. Mono Input Pod.

The input pod has separate mic and line inputs, hi and lo pass filters, a direct output and a 20 led meter.

The mic input signal passes through T filters L1 and L2, via a switchable 20dB pad and AC coupling capacitors C2 and C3 on to the base of low noise transistors Q4 and Q6. Further filtering is provided by capacitors C5, C6 and C7 and pre-set VR1 sets the pad CMR. 48 volt phantom power can be supplied to the input via current limiting resistors R1, R3 and switch SW1. Transistors Q4 and Q6 provide amplification of the signal and their collectors form an output to IC1 which functions as a comparitor. This gives a buffered output to the following circuits and ensures the amplification transistors are operating at constant current by providing feedback via transistors Q3 and Q5. Transistors Q3 and Q5 form a voltage to current converter and phase splitter in conjunction with the constant current source formed by Q1 and Q2. By providing this balanced current feedback to the amplifier transistors Q4 and Q6 the common mode load resistance seen at their emitters is infinity and the common mode gain of the overall circuit is zero. The differential load is set by the potentiometer VR3 which adjusts the gain of the circuit by 55dB; effectively shorting out the negative current feedback to greater or lesser extents. High frequency stability and constant bandwidth at all gains is assured by capacitors C8, C9, C10 and C12.

The mic amplifier output feeds the frequency adjustable hi and lo pass filters which are second order active networks formed around IC2.

The line input signal passes through T filters L3 and L4 and on to the differential amplifier formed by IC3. Pre-set VR6 provides CMR adjustment and capacitors C23, C24, C25 and C28 provide additional high frequency filtering; C29 and C36 provide AC coupling. The signal passes on to amplifier IC4 which provides 40dB of gain adjustment in conjunction with potentiometer VR7.

FET’s Q8, Q9 and the second half of amplifier IC4 select the mic or line input to pass on to the phase change over amplifier formed by IC7 and FET Q10. Control of the mic/line and phase change is achieved by invertor IC9 via transistor Q11 and CMOS switch IC8. IC9 is configured as a pair of bi-stable flip flops which are triggered by switches SW3, SW4, capacitors C65 and C67 and is connected to the automation system via R86 and R83.

CMOS switch IC8 also selects the signal feed to the 20 led meter in conjunction with amplifier IC6. This automatically selects mic or line amplifier to feed the meter if the meter pre change over line is logic high and monitors the input module signal level via the meter post feed if it is logic is low.

The meter circuit is formed by the peak responding full wave rectifier and buffer IC10 and meter drive IC11 and IC12. 0dB adjustment is via pre-set VR9 and offset adjustment is via pre-set VR10.

The direct output signal from the input module is buffered by amplifier IC6 and fed to the differential output amplifier formed by IC5. Output symmetry is adjusted by pre-set VR8 and high frequency stability into any load is assured by filter capacitors C46, C47, C48 and C49. Further filtering is achieved by T filters L5 and L6 and AC coupling is via C44 and C45.

4. Mono Input Module.

The input module houses the analogue insert, EQ, VCA, mute, pan and bus feed circuits along with logic circuits to control routing and other major functions.

Audio signals are received from the input pod via differential amplifier IC9 and fed to the insert and EQ circuits. The order of these elements is determined by switch SW3. ST1 connects the input module to the test input bus: this is for factory or service use only and the links should be set to the “normal” position at all other times.

The insert send circuit is formed by the differential output amplifier IC10. Output symmetry is adjusted by pre-set VR1 and high frequency stability into any load is assured by filter capacitors C46, C47, C48 and C49. Further filtering is achieved by T filters in the console frame and AC coupling is via C44 and C45.

The insert return circuit is fed via T filters in the frame to the differential amplifier IC11. Pre-set VR2 provides CMR adjustment and capacitors C52, C53, C54 and C55 provide additional high frequency filtering; C56 and C57 provide AC coupling.

The EQ is a 4 band full parametric type for which all the active circuits are housed on two ceramic hybrids HD1 and HD2. High performance is achieved by use of laser trimmed precision resistors and surface mount components. HD1 has the treble and hi mid equaliser, and HD2 has the lo mid and bass.

Insert and EQ in/out switching is performed by FET’s Q1, Q2, Q3 and Q4 in conjunction with amplifiers IC12 and IC13. The FET’s are controlled from the automation system via shift register IC31 and CMOS switch IC14.

After the insert and EQ the audio signal is buffered by amplifier IC15 and split to fed both pre fade mute and VCA circuits. The VCA IC16 is controlled from the fader via the vca line and buffer amplifier IC19. Pre-set VR4 sets the nominal VCA gain to +10dB and VR3 trims the distortion to a minimum.

FET’s Q5, Q6, Q7 and Q8 create the mute circuit in conjunction with amplifier IC17. Control of the mute and mute indicator is achieved via invertor IC20 and triple input AND gate IC21. The indicator will illuminate at half brightness if the solo in place is active and the solo line is not, if the mute all is active or if the mute line is active. If a link is fitted at ST2 the indicator will illuminate at half brightness when the VCA gain falls below -70dB. A comparitor IC19 monitors the vca line for this function which can also be used to drive a fader start relay RLA1 as an option. When the mute switch SW6 is pressed it triggers a bi-stable flip flop formed by IC20. When this bi-stable activates the mute or the automation recalls a mute via the mute auto and R146 the indicator will illuminate at full brightness.

The direct output can be sourced post fade, pre fade or pre insert and EQ. Switches SW4 and SW5 make this selection and the output level is then adjusted by potentiometer RV13 before being amplified by IC18.

Pre and post VCA signals are fed to the pan circuits formed by potentiometer RV14 (+RV114) and amplifiers IC22 and IC25. Six summing buffers formed by IC23, IC24 and IC26 are used to drive 42 of the modules bus sends. Transistors Q12, Q13, Q14, Q15, Q16, Q17, Q20 and Q21 increase current drive capabilities of the buffers when required. Crosstalk and noise are kept to a minimum within the module and the console bus system by use of an active ground reference system. A “clean” 0VA or noise reference is sent from the master module to all the input modules. This is buffered by IC27 which provides the active ground reference which is summed into all the bus send circuits and provides a clean earth for all the aux output potentiometers. VR5 adjusts the DC offset on the active earth to a minimum. This is necessary to reduce transient noise as signals are switched off or on to a bus.

FET’s Q18, Q19, Q22, Q23, Q25 and Q26 are used to connect pre fade and post fade stereo signals to the solo busses. The FET’s are controlled from the VCA fader block via the solo line and transistor Q24.

Switches SW7 to SW21 are used to connect pre fade or post fade signals to the aux send potentiometers RV15 to RV34. These provide adjustment of the current fed on to the bus via fet hybrids HA1, HA2 and HA3. The hybrids provide signal on of switching and are located directly above the buss connectors so as to minimise the bus length and crosstalk. They are controlled by automation system via shift registers IC29, IC30 and IC31, and voltage translating hybrids HB3 to HB7. Status LED’s for the aux busses and other automated functions are arranged in constant current chains and are controlled from the shift registers via led hybrids HC1 to HC6.

The group busses are controlled in a similar way from shift register IC28 via hybrids HB1, HB2, HA4 and HA5. The master buss is controlled from shift register IC31 via Transistor Q33 and FET’s Q29, Q30, Q31 and Q32.

All bus switching is directly controlled from the automation system in the fader tray via data, strobe and clock lines 1 and 2. The status of switch SW27 to SW49 is monitored by the automation system via resistor ladders R250 to R272 and analogue to digital converter lines 1,2 and 3. Positive and negative references for the resistor ladders are provided directly from the fader tray via +5V switch and 0V switch lines.

5. Stereo Input Pod (option).

The stereo input pod has two mic/line level inputs, a gain balance control, hi pass filters, direct outputs and a two 11 led meters.

The mic input signals pass through T filters L1, L2, L3 and L4, to the switchable 25dB pads formed by R9, R10, R11, R42, R43 , R44 and switch SW2. Pre-sets VR1 and VR3 set the pad CMR to a maximum. Switch SW1 connects 48 volt phantom power to the inputs and AC coupling capacitors C3, C4, C21 and C22 connect the input signals on to the bases of low noise transistors Q2, Q3, Q8 and Q9. Further high frequency filtering is provided by capacitors C5, C8, C9, C23, C26 and C27.

Transistors Q2, Q3, Q8 and Q9 provide amplification of the signals and their collectors form an output to IC1 which functions as a comparitor. This gives buffered outputs to the following circuits and ensures the amplification transistors are operating at constant current by providing feedback via transistors Q4, Q5, Q10 and Q11. These transistors form a voltage to current converters and phase splitters in conjunction with the constant current sources formed by Q6, Q7, Q12 and Q13. By providing this balanced current feedback to the amplifier transistors the common mode load resistance seen by their emitters is infinity and the common mode gains of the overall circuits are zero. The differential loads are set by the potentiometer VR1 which adjusts the gain of the circuits by 55dB. It does this by effectively shorting out the negative current feedback to greater or lesser extents. High frequency stability and constant bandwidth at all gains is assured by capacitors C10, C14, C15, C28, C32, C33 and C34.

The nominal differential gain of the mic amp is 15dB to 70dB. If the transformer option is fitted the transformer (1:5) provides 14 dB of gain and the active circuit needs to be adjusted to provide the remaining 1dB to 56dB of gain and present a much higher impedance for the transformer output. This is achieved by component changes as marked on the schematic.

The mic amplifier outputs feed the balance pan circuits formed by amplifier IC2 and potentiometer RV2. This provides up to 10dB of reciprocal boost and cut.

The balance pan outputs are then fed to the frequency adjustable hi pass filters. These are second order active networks formed around amplifier IC3 and adjusted by potentiometer RV3.

The filter outputs feed the phase change circuits which are formed by amplifier IC4. These operate in non inverting mode until switch SW4 or SW5 are activated. When this is done FET Q14 or Q15 are switched on causing the appropriate amplifier to operate in inverting mode.

CMOS switch IC6 selects which signals are feed to the 11 led meters in conjunction with transistors Q16, Q17 and Q18. If the meter pre change over line is logic high the meters monitor the mic amp output and if it is logic is low the meters monitors the input module signals via the direct output lines.

The meter circuits are formed by amplifier IC8 which is configured as two peak responding half wave rectifiers and meter drive IC9 and IC10. 0dB adjustment is via pre-sets VR6 and VR9. Comparitor IC11 is used in conjunction with transistors Q22 and Q23 to provide a signal present led drive at -25dBu

The direct output signals from the input module fed to the differential output amplifiers formed by IC5 and IC7 via links on socket SK7, SK8, SK9 and SK10. These can select the direct output source from the input module or direct from the mic amplifier outputs. Output amplifier symmetry is adjusted by pre-sets VR5 and VR8 while high frequency stability into any load is assured by filter capacitors C53, C54, C55, C58, C71, C72, C73 and C76. Further filtering is achieved by T filters L5, L6, L7, L8 and AC coupling is via C56, C57, C74 and C75.

6. Stereo Input Module (option).

The stereo input module houses the analogue insert, EQ, VCA, mute, pan and bus feed circuits along with logic circuits to control routing and other major functions.

Audio signals are received from the stereo input pod and fed to the insert and EQ circuits via sockets ST1 and ST7. These can be used to connects the module to the test input bus: this is for factory or service use only and both sockets should have their links set to the “normal” position at all other times.

The insert send circuits are formed by the differential output amplifiers IC2 and IC4. Output symmetry is adjusted by pre-sets VR1 and VR6 whilst high frequency stability into any load is assured by filter capacitors C3, C4, C5, C6, C17, C18, C19 and C20. Further filtering is achieved by T filters in the console frame and AC coupling is via C7, C8, C21 and C22.

The insert return circuits are fed via T filters in the frame to differential amplifiers IC3 and IC5. Pre-sets VR2 and VR7 provides CMR adjustment and capacitors C9, C10, C11, C12, C23, C24, C25 and C26 provide additional high frequency filtering; C13, C14, C27 and C28 provide AC coupling.

The EQ is 4 band with full parametric mid frequencies for which all the active circuits are housed on a removable sub board. The treble and bass circuits are formed around invertor amplifiers IC11 and IC 17. Potentiometers RV1 and RV10 adjust the level and phase of the signals that are feed back to the non inverting inputs of IC11 and IC17. This controls the boost and cut of the filters. The feed back is fed via frequency adjustable second order (hi and lo pass) filters which are formed by amplifiers IC12 and part of IC17. Frequency adjustment of these filters is achieved via potentiometers RV3 and RV12. The mid frequency circuits are created in a similar way using invertor amplifiers IC13, IC14, IC15 and IC16 but utilising the band pass output from state variable filters to provide the frequency and bandwidth adjustment. Potentiometers RV4 and RV5 provide the filter boost and cut adjustment whilst RV6 and RV9 adjust the frequency. Potentiometers RV5 and RV8 adjust the relative levels of the two feed back paths within the state variable filters so as to adjust the band width of the EQ.

Insert and EQ in/out switching is performed by CMOS switches IC6 and IC18. These are controlled from the automation system via shift register IC31 and transistors Q1 and Q2.

Direct output feeds to the stereo pod are provided post insert and EQ but they can be selected to be pre insert and EQ by links on the pod module.

After the insert and EQ the audio signals are fed to FET's Q5, Q6, Q7 and Q8 which create the pre fade mute circuits in conjunction with amplifier IC7. Control of the mute and mute indicator is achieved via invertor IC20 and triple input AND gate IC21. The indicator will illuminate at half brightness if the solo in place is active and the solo line is not, if the mute all is active or if the mute line is active. If a link is fitted at ST2 the indicator will illuminate at half brightness when the VCA gain falls below -70dB. A comparitor IC19 monitors the vca line for this function which can also be used to drive a fader start relay RLA1 as an option. When the mute switch SW6 is pressed it triggers a bi-stable flip flop formed by IC20. When this bi-stable activates the mute or the automation recalls a mute via the mute auto and R146 the indicator will illuminate at full brightness.

The post mute signals feed the VCA circuits formed by amplifier IC10 and VCA's IC8 and IC9. The VCA's are controlled from the fader via the vca line and buffer amplifier IC19. Pre-set VR4 sets the nominal VCA gains to +10dB whilst VR3 and VR8 trim the distortion levels to a minimum. FET's Q36 and Q37 create post VCA attenuators that ensure maximum cut off when the fader down or the channel is muted. These are controlled like the mute FET's from triple input AND gate IC21.

Pre and post VCA signals are fed to the pan circuits formed by potentiometer RV13, RV14 and summing buffers IC23 and IC26. The buffers drive the 16 groups, 8 stereo auxes and the 2 solo busses. Transistors Q16, Q17, Q20 and Q21 are used to increase current drive capabilities when required. A further summing buffer IC24 is used with transistors Q12, Q13, Q14 and Q15 to provide pre and post fader summed mono signals to drive the 16 mono aux busses. Crosstalk and noise are kept to a minimum within the module and the console bus system by use of an active ground reference system. A "clean" 0VA or noise reference is sent from the master module to all the input modules. This is buffered by IC27 which provides the active ground reference which is summed into all the bus send circuits and provides a clean earth for all the aux output potentiometers. VR5 adjusts the DC offset on the active earth to a minimum. This is necessary to reduce transient noise as signals are switched off or on to a bus.

FET's Q18, Q19, Q22, Q23, Q25 and Q26 are used to connect pre fade and post fade stereo signals to the solo busses. The FET's are controlled from the VCA fader block via the solo line and transistor Q24. The pre fade signal is mono and derived from the left and right signals via summing amplifier IC1.

Switches SW7 to SW21 are used to connect pre fade or post fade signals to the aux send potentiometers RV15 to RV34. These provide adjustment of the current fed on to the bus via fet hybrids HA1, HA2 and HA3. The hybrids provide signal on of switching and are located directly above the buss connectors so as to minimise the bus length and crosstalk. They are controlled by automation system via shift registers IC29, IC30 and IC31, and voltage translating hybrids HB3 to HB7. Status LED's for the aux busses and other automated functions are arranged in constant current chains and are controlled from the shift registers via led hybrids HC1 to HC6.

The group busses are controlled in a similar way from shift register IC28 via hybrids HB1, HB2, HA4 and HA5. The master buss is controlled from shift register IC31 via Transistor Q33 and FET's Q29, Q30, Q31 and Q32.

All bus switching is directly controlled from the automation system in the fader tray via data, strobe and clock lines 1 and 2. The status of switch SW27 to SW49 is monitored by the automation system via resistor ladders R250 to R272 and analogue to digital converter lines 1,2 and 3. Positive and negative references for the resistor ladders are provided directly from the fader tray via +5V switch and 0V switch lines.

7. Group Module (and mic input option).

The group module is divided in to 3 independent sections; aux return, aux send and audio groups.

For XL411 group modules:-

The aux return input is fed via T filters in the frame to a differential amplifier IC1. Pre-set VR1 provides CMR adjustment and capacitors C1, C2, C3 and C4 provide additional high frequency filtering; C56 and C82 provide AC coupling.

The signal then passes to a simple shelving EQ formed by amplifier IC2 and potentiometers RV1 and RV2 before entering the VCA IC3. The VCA gain is controlled by potentiometer RV3 via amplifier IC5. The 0dB calibration is set by pre-set VR3 and the distortion is trimmed to a minimum by pre-set VR2. The VCA can also be controlled from the master vca fader busses which are connected via switches SW4 to SW13.

For XL414 group modules:-

The aux return input is fed via T filters in the frame to a special 2 stage differential mic/line amplifier which has a continuously variable gain control and is capable of boosting by up to 50dB or attenuating by up to 30dB. Switch SW33 connects 48 volts to the input signal while C1 and C2 provide AC coupling to the low noise amplifier transistors Q37 and Q38. The common mode gain of the transistor pre-amplifier circuit is set very low to allow high signal levels to pass without clipping and it is matched by pre-set VR1 so as to give the maximum CMR when the signals are de-balanced by amplifier IC2. The differential gain of this stage is adjustable from +36dB to -4dB by half of VR3.

The signal then passes to a simple shelving EQ formed by amplifier IC2 and potentiometers RV1 and RV2 before entering the VCA IC3. The VCA gain is controlled by the second half of potentiometer RV3 via amplifier IC5. The gain is adjustable from +14dB to -26dB which when added to the first stage gain gives the full +50dB to -30dB range. The +50dB gain calibration is set by pre-set VR3 and the distortion is trimmed to a minimum by pre-set VR2. The VCA can also be controlled from the master vca fader busses which are connected via switches SW4 to SW13.

The remaining descriptions apply to both types of group module:-

The signal then passes through amplifier IC4 and FET's Q1 and Q2 which form the mute circuit. This is controlled by invertor IC8 which forms a bi-stable flip flop which is triggered by switch SW2 and capacitor C183. Transistor Q3 drives the FET's can be further controlled by the automation system via R249 or the mute aux return line.

The post mute signal is selected to pass directly to the audio group circuits by SW1 or to the master busses via the pan potentiometer RV4, amplifier IC7 and FET's Q4 and Q5.

The aux return signal can be sent to the solo busses via FET's Q6, Q7 and Q8. These are controlled by NAND gate IC9, invertor IC8 and transistor Q11. Sections A and B of the NAND gate form a bi-stable flip flop which is triggered by switch SW3 and capacitor C39. When a solo is first enabled capacitor C42 creates a negative going pulse which is inverted and buffered by section D of IC9. This will clear any other solos but is prevented from self clearing by the logic low charge held on C39; once this capacitor has charged to a logic high the solo can be cleared by the solo clear bus via section C of IC9. If the solo switch is held down capacitor C38 dis-charges and resets the flip flop; the solo is now held on by diode D8 until the switch is released. Aux return signals can also be soloed as part of a vca solo group; this is selectable via SW4 to SW13.

Group and aux summing amplifiers IC11 and IC15 are referenced to a "clean" 0VA or noise reference which is sent from the master module to minimise crosstalk and mains born interference. Capacitors C74 and C79 provide AC coupling and capacitor/resistor networks C72, C77, R161 and R170 ensure maximum stability and high frequency rejection at all gains.

Bus inject signals are fed via T filters in the frame to differential amplifiers IC10 and IC14. Presets VR4 and VR5 provide CMR adjustment and capacitors C46, C47, C48, C49, C66, C67, C68 and C69 provide additional high frequency filtering. C50, C51, C70 and C71 provide AC coupling.

The summing amplifier outputs are fed via the change over switch SW16 to the second half of amplifiers IC11 and IC15 where they are summed with the bus inject signals and talk signals from the comms module.

The aux send signal passes from amplifier IC11 through level potentiometer RV5 to 10dB amplifier IC27. It then passes via mute switch SW14 to the differential output amplifier IC17. Output symmetry is adjusted by pre-set VR6 and high frequency stability into any load is assured by filter capacitors C88, C89, C92 and C94. Further filtering is achieved by T filters in the console frame and AC coupling is via C87 and C93.

The aux send signal can be sent to the solo busses via CMOS switch IC12 which is controlled by NAND gate IC13. Sections A and B of the NAND gate form a bi-stable flip flop which is triggered by switch SW15 and capacitor C64. When a solo is first enabled capacitor C62 creates a negative going pulse which is inverted and buffered by section C of IC13. This will clear any other solos but is prevented from self clearing by the logic low charge held on C64; once this capacitor has charged to a logic high the solo can be cleared by the solo clear bus via section D of IC9. If the solo switch is held down capacitor C63 dis-charges and resets the flip flop; the solo is now held on by diode D42 until the switch is released. Additional FET's Q13, Q14 and Q15 are used to connect or disconnect the entire module from the solo busses. If any solo is active on the module transistors Q17 and Q18 switch the FET's on.

The summed group bus signal is fed to the insert send circuit which is formed by the differential output amplifier IC16. Output symmetry is adjusted by pre-set VR7 and high frequency stability into any load is assured by filter capacitors C86, C85, C86 and C96. Further filtering is achieved by T filters in the console frame and AC coupling is via C83 and C95.

The insert return circuit is fed via T filters in the frame to the differential amplifier IC18. Pre-set VR8 provides CMR adjustment and capacitors C98, C99, C100 and C101 provide additional high frequency filtering; C102 and C103 provide AC coupling.

The insert is switched in or out of circuit by switch SW18 and the signal is then buffered by amplifier IC19 and split to fed both pre fade mute and VCA circuits. The VCA IC20 is controlled from the fader RV6 and buffer amplifier IC22. Pre-set VR10 sets the nominal VCA gain to +10dB and VR9 trims the distortion to a minimum. The VCA can also be controlled from the grand master vca fader busses which are connected via switches SW30 and SW31.

FET's Q19, Q20, Q21 and Q22 create the mute circuit in conjunction with amplifiers IC19 and IC21. Control of the mute and mute indicator is achieved via invertor IC24 which forms a bi-stable flip flop triggered from switch SW20 and capacitor C141. The indicator will illuminate at half brightness if an automute master on the comms module has activated the mute. The indicator will illuminate at full brightness if the mute switch is pressed to activate the mute or the automation recalls a mute via R236. The audio group is assigned to auto mute groups by switches SW21 to SW29.

The group output is fed to a differential output amplifier IC23. Output symmetry is adjusted by pre-set VR11 and high frequency stability into any load is assured by filter capacitors C133, C134, C135 and C137. Further filtering is achieved by T filters in the console frame and AC coupling is via C132 and C136.

The group output can also be routed to the master busses via the pan potentiometer RV20, pan buffer amplifier IC25 and FET's Q27, Q28, Q29 and Q30. The FET's are controlled by switch SW19.

The group signal can be sent to the solo busses via FET's Q31, Q32 and Q33. These are controlled by NAND gate IC26, invertor IC24 and transistor Q35. Sections A and D of the NAND gate form a bi-stable flip flop which is triggered by switch SW32 and capacitor C155. When a solo is first enabled capacitor C152 creates a negative going pulse which is inverted and buffered by section B of IC26. This will clear any other solos but is prevented from self clearing by the logic low charge held on C155; once this capacitor has charged to a logic high the solo can be cleared by the solo clear bus via section C of IC26. If the solo switch is held down capacitor C151 discharges and resets the flip flop; the solo is now held on by diode D90 until the switch is released. The group signal can also be soloed as part of a vca solo group; this is selectable via SW30 to SW31.

8. Master Module.

The master module controls the 3 main outputs and incorporates inserts, solo in place functions as well as additional record outputs and meters.

The master summing amplifiers IC2 and IC4 are used to recover voltage from the master left and right busses and from the master aux left and right busses via FET's Q1 and Q2. The aux inputs can be muted by switch SW1 which controls the FET's and also activates mutes on the group module via the mute aux control line. The master module provides a "clean" 0VA or noise reference which is sent to all the input and group modules to minimise crosstalk and mains born interference. This is also used as a reference for the summing amplifiers; capacitors C7 and C16 provide AC coupling and capacitor/resistor networks C8, C17, R12 and R32 ensure maximum stability and high frequency rejection at all gains.

A pan balance control is formed by potentiometer RV1 and the second halves of amplifiers IC2 and IC4. The output from the pan buffer is summed with the bus inject signals at IC5 and IC6 to provide left, right and mono signals. Note that the pan control only acts on the bus signals not the bus inject.

Bus inject signals are fed via T filters in the frame to differential amplifiers IC1 and IC3. Pre-set VR1 and VR2 provide CMR adjustment and capacitors C1, C2, C3, C4, C10, C11, C12 and C13 provide additional high frequency filtering; C5, C6, C14 and C15 provide AC coupling.

The left, right and mono signals pass to the insert points via CMOS switches IC7 and IC8 which select either master or solo signals depending on the solo in place status. The insert send circuits are formed by differential output amplifiers IC11, IC13 and IC15. Output symmetry is adjusted by pre-sets VR3, VR5 and VR7 while high frequency stability into any load is assured by filter capacitors C34, C35, C36, C37, C49, C50, C51, C52, C64, C65, C65 and C67. Further filtering is achieved by T filters in the console frame and AC coupling is via C38, C39, C53, C54, C68 and C69.

The insert return circuits are fed via T filters in the frame to the differential amplifiers IC12, IC14 and IC16. Pre-sets VR4, VR6 and VR8 provides CMR adjustment and capacitors C40, C41, C42, C43, C55, C56, C57, C58, C70, C71, C72 and C73 provide additional high frequency filtering; C44, C45, C59, C60, C74 and C75 provide AC coupling. The inserts are selected in or out by switches SW2, SW3 and SW4.

Post insert signals are fed to the VCA's which adjust the signal level and perform signal mutes via control from faders RV2, RV3, CMOS switch IC25 and amplifiers IC24 and IC26. Pre-set VR15 sets the nominal VCA gain to +10dB and VR9, VR11 and VR13 trim the distortion to a minimum.
 The VCA outputs connect to differential output amplifiers IC19, IC21 and IC23. Output symmetry is adjusted by pre-sets VR10, VR12 and VR14 while high frequency stability into any load is assured by filter capacitors C82, C83, C84, C85, C93, C94, C95, C96, C104, C105, C106 and

C107. Further filtering is achieved by T filters in the console frame and AC coupling is via C86, C87, C97 C98, C108 and C109.

The signal mutes are switched from switches SW6, SW7 and SW8 which toggle the bi-stable flip flops formed by invertor IC28 via capacitors C123, C125 and C127. The mute all switch SW9 overrides the mute control lines when it is active and sends the mute all control line logic high to activate other mutes within the console. Automation of the master mutes is achieved through resistors R174, R179 and R184.

The solo switch logic is performed by NAND gates IC29 and IC30. These form bi-stable flip flops which are triggered by switches SW11, SW12, SW13 and capacitors C133, C136 and C140. If a solo switch is held down, a capacitor C134, C137 or C139 dis-charges and resets the flip flop; the solo continues to be held on by diode D47, D48 or D49 until the switch is released. The master solos perform in a different way to the other solos on the console. When solos on the console are active they do not clear the master solos via the solo clear line; instead the solo on line temporarily overrides the master solo by activating triple OR gate IC32. When the other solos on the console are switched off the master solo is reactivated. If the solo in place switch SW10 is on and the solo on line is active (indicating a solo on the console is on) the NAND gate IC31 sends control messages to the CMOS switches IC7 and IC8 which replace the master output with signals from the solo bus. IC31 also ensures the timely removal of any master signal on the solo bus to prevent oscillation and sends a solo in place active signal to the input modules which illuminates their mute LED’s. Because the master feed to matrix is before CMOS switches IC7 and IC8 it is possible to solo in place matrix outputs without oscillation occurring even if they contain signal from the master module.

The record outputs are fed from the pre insert master left and right signals via potentiometers RV4(104) and RV5(105) to amplifiers IC35 and IC41. Their output is sent to the mute CMOS switch IC36 which is controlled by invertor IC42. The invertor forms two bi-stable flip flops which are triggered by switches SW14 , SW15 and capacitors CI88 and C190. The output from the mute circuits is fed to differential output amplifiers IC37, IC38, IC39 and IC40. Output symmetry is adjusted by pre-sets VR16, VR17, VR19 and VR20 while high frequency stability into any load is assured by filter capacitors C155, C156, C157, C158, C162, C163, C164, C165, C174, C175, C176, C177, C181, C182, C183 and C184. Further filtering is achieved by T filters in the console frame and AC coupling is via C159, C160, C166, C167, C178, C179, C185 and C186.

The record outputs also feed to the peak reading meter rectifiers formed by amplifier IC35 and IC41. These respond to which ever is the highest of the left and right signals and are calibrated by pre-sets VR18 and VR21. The mono signal is fed via CMOS switch IC7 to a full wave peak reading rectifier which is formed by amplifier IC43. 0dB adjustment is via pre-set VR22 and offset adjustment is via pre-set VR23. The meter LED chains are driven from constant current sources to meter IC45, IC46, IC47 and IC48.

9. Comms Module.

The comms module houses the intercom and talk system, solo monitoring and auto mute masters.

The comms and talk mic signals are amplified by VOGAD’s IC2 and IC4. These are designed to operate with most types of un-powered low impedance microphones and will compress the signals to give a constant output of -19dBu. This level is then further amplified by amplifiers IC3 and

IC5. It is possible to link the talk and comms system via SW5; when the link is active the output from amplifier IC3 is summed into amplifier IC5 via resistor R10.
The amplified comms signal passes via the comms on switch SW6 to the output/input isolation transformer T1 and the side tone comms cancellation circuit formed by the second half of differential amplifier IC5. This out going signal is fed to both sides of the differential amplifier where it seen as common mode and is rejected. The amount of rejection can be adjusted by pre-set VR1.
The incoming signal is fed to the differential amplifier on one input only via transformer T1 and resistor R45; the signal is there for seen as differential and is amplified. The output of amplifier IC5 is fed via the comms level control RV3 to the headphone amplifier which is located below the group meters in the back of the console. The signal can also be routed into the stereo headphones, the local output and talk system via the link switch SW5.

The comms call lamp in SW17 is illuminated when positive DC (supplied from external intercom equipment and referenced to the comms ground) is applied to the incoming comms signal. Opto-isolator IC21 and transistor Q7 provide the sensing and drive for the call lamp whilst maintaining isolation. When the call switch SW17 is activated opto-isolator IC20 connects a positive DC offset to the comms signal to illuminate the call lamp on external comms equipment. The DC signals and comms ground are normally referenced to the console 0VA via a 100R resistor R146 but if power is supplied to the comms power line all the comms connections are totally isolated from the console ground by relay RA1. They will continue to operate deriving all power and references from the external source.

The stereo head phones and local output levels are controlled by VCA’s IC8 to IC11. Their gain is adjusted by DC voltages from fader RV2 and potentiometer RV1; switches SW1 and SW3 inject DC to mute the VCA’s. The headphone and local output controls can be swapped over by switch SW2 which routes the signal to vca buffer amplifier IC1. The local VCA is dimmed by 20dB when the talk mic is on to avoid the feed back. This is achieved by introducing a voltage offset at the vca buffer amplifier via resistors R13 and R121. The signal source to the VCA’s is selected by switches SW5, SW6 and CMOS switch IC6. The CMOS switch selects between stereo solo (AFL) and mono PFL signals and is controlled by the PFL monitor switch SW4 via transistors Q1 and Q2. They also control a second CMOS switch IC7 which routes appropriate signals to the meters.

The VCA’s IC8 to IC11 are trimmed for minimum distortion by pre-sets VR2 to VR5 and voltages are recovered from the output currents by amplifier IC12. This buffers the signals and feeds headphone amplifier via resistors R87 and R90 and to the local output differential amplifiers IC14 and IC15. Output symmetry is adjusted by pre-set VR6 and VR7 while high frequency stability into any load is assured by filter capacitors C53, C54, C55, C57, C59, C60, C61 and C63. Further filtering is achieved by T filters in the console frame and AC coupling is via C52, C56, C58 and C62.

The talk system receives signals from the talk mic amplifier and can be linked to the comms mic amplifier as described above. The talk mic amplifier signal is summed with other talk signals by amplifier IC19. The other signals come from the oscillator, the pink noise generator and the external input. Their level is controlled by potentiometer RV4 while the level of the talk mic amplifier is controlled by potentiometer RV5. The talk switch SW10 connects the talk mic amplifier signal and sends a DC level to dim the local output via transistor Q3.

The oscillator is a wien bridge type formed by amplifier IC18. Positive feed back via a band pass filter sets up oscillations the frequency is adjusted by potentiometer RV6. Negative feedback is also applied to control the oscillation via resistor R128. This is shorted out by FET Q4 if the oscillation amplitude is too low but once the oscillation amplitude is high enough diode D23 charges capacitor C89 negative which feeds the gate of the FET, raising its impedance and allowing enough negative feedback to provide controlled oscillation. Pre-set VR9 matches the circuit voltages to the FET gate off voltage so as to set the oscillator amplitude to +14dBu. Switch SW9 is connects or disconnects the oscillator to the talk system and stops oscillation in the oscillator when it is disconnected by charging capacitor C89 negative.

White noise is provided by IC9 and filtered by resistors R101 to R104 and C72 to C76 to produce pink noise. This is amplified to produce 0dBu peak at the output of amplifier IC18. The signal is connected to the talk system via switch SW8.

The external input is fed via T filters in the frame to the differential amplifier IC16. Pre-set VR8 provides CMR adjustment and capacitors C64, C65, C66 and C67 provide additional high frequency filtering; C68 and C69 provide AC coupling. The external input is connected to the talk system via the external on switch SW7. This switch also connects the talk system to the external output via differential output amplifier IC38. Output symmetry is adjusted by pre-set VR16 and high frequency stability into any load is assured by filter capacitors C273, C274, C275 and C277. Further filtering is achieved by T filters in the console frame and AC coupling is via C272 and C276.

The talk system can also be selected to route to the master left, right and mono busses and the matrix, group and aux busses via switches SW11 to SW16. The buffer for this is formed by amplifier IC3 and transistors Q5 and Q6.

The solo summing amplifiers IC24 and IC26 are used to recover voltage from the solo left, right and PFL busses. They are referenced to a “clean” 0VA or noise reference which is sent from the master module. Capacitors C103, C106 and C121 provide AC coupling and capacitor/resistor networks C102, C105, C120, R156, R160 and R178 ensure maximum stability and high frequency rejection at all gains.

The solo bus inject signals are fed via T filters in the frame to differential amplifiers IC22, IC23 and IC25. Pre-sets VR10, VR11 and VR12 provide CMR adjustment and capacitors C96, C97, C98, C99, C108, C109, C110, C111, C114, C115, C116 and C117 provide additional high frequency filtering. C100, C101, C112, C113, C118 and C119 provide AC coupling.

The amplified solo signals route to the head phone and local outputs via CMOS switch IC6. They also route to the solo bus outputs via differential output amplifiers IC27, IC28 and IC29. Output symmetry is adjusted by pre-sets VR13, VR14 and VR15 while high frequency stability into any load is assured by filter capacitors C128, C129, C130, C132, C134, C135, C136, C138, C140, C141, C142 and C144. Further filtering is achieved by T filters in the console frame and AC coupling is via C127, C131, C133, C137, C139 and C143.

The solo switching system can operate in two ways, automatic cancelling or additive. The default is cancelling in which case any active solo will cancel all previously active solos. When a solo is first enabled it sends a DC pulse on the solo clear line which is received by all other solo circuits which switches them off. A local timer inhibits input from the clear line for a short time to stop self cancelling. The hold off time is long enough to allow both sides of stereo signals to be monitored providing both solos are enabled at the same time.

The comms module plays no part in the cancelling mode of operation but it is used to select the additive mode via section A of invertor IC37 and section A of NAND gate IC36. These gates form a bi-stable flip flop which is triggered by the solo add switch SW26 and capacitor C181. When additive mode is active section B of IC36 holds the solo clear line low via diode D66. This shorts out any clear pulses and eliminates the cancelling action. When the solo add mode is switched off capacitor C182 creates a negative going pulse which is inverted by section B of IC37 and fed on to the solo clear line via diode D67 which cancels all active solos.

Any solo on the console will set the solo on line high when it is active. Section C of invertor IC37 and transistors Q8 and Q9 sense this line and illuminate the lamp in switch SW27 if a solo is on. If the solo clear switch SW27 is pressed it triggers a mono-stable flip flop formed by section E and F of IC37 and section C of IC36. This temporarily overrides the additive mode via section B of IC36 and produces a pulse on the clear line via section B of IC37 which cancels all active solos.

The 8 automute master switches are formed by the NAND gates IC30, IC31, IC32 and IC33. These gates form bi-stable flip flops which are triggered by switches SW18, SW19, SW20, SW21, SW22, SW23, SW24 and SW25 and capacitors C147, C150, C153, C156, C159, C162, C165 and C168. The outputs from these flip flops are fed via passive lo pass filters to ideal diode buffer amplifiers formed by amplifiers IC34 and IC35. These provide a low impedance drive onto the automute busses but allow diode “or” action to take place when consoles are linked.

10. Matrix Module.

The matrix module houses the group to matrix level controls, the matrix insert and main outputs as well as the stereo aux output master controls.

The pre and post fader audio group signals are received via the edge connector SK3. CMOS switches IC16, IC18, IC20, IC21, IC22, IC24, IC25 and IC26 select pre or post fade signals to feed the matrix. This selection is controlled by the global pre on switch SW4 and transistors Q2 and Q3. All signals are buffered by amplifiers IC17, IC19, IC23 and IC24 and fed to the matrix bus and summing amplifiers via level control potentiometers RV6 to RV37.

Matrix bus inject signals are fed via T filters in the frame to differential amplifiers IC9 and IC15. Pre-set VR6 and VR9 provide CMR adjustment and capacitors C42, C43, C44, C45, C69, C70, C71 and C72 provide additional high frequency filtering; C46, C47, C73 and C74 provide AC coupling.

Inputs from the master module (pre fader) are buffered by amplifier IC11 and fed to the matrix busses via potentiometers RV2 to RV5. The matrix busses are virtual earth types which are summed by amplifiers IC10 and IC13. Capacitors C52 and C53 provide AC coupling and capacitor/resistor networks C50, C54, R82 and R91 ensure maximum stability and high frequency rejection at all gains.

The summed matrix signals are fed to the insert send circuits formed by differential output amplifiers IC12 and IC14. Output symmetry is adjusted by pre-sets VR7 and VR8 while high frequency stability into any load is assured by filter capacitors C58, C59, C60, C62, C64, C65, C66 and C68. Further filtering is achieved by T filters in the console frame and AC coupling is via C57, C61, C63 and C67.

The insert return circuits are fed via T filters in the frame to the differential amplifiers IC28 and

IC32. Pre-sets VR10 and VR13 provides CMR adjustment and capacitors C77, C78, C81, C82, C96, C97, C98 and C99 provide additional high frequency filtering; C83, C84, C100 and C101 provide AC coupling. The inserts are selected in or out by switches SW7 and SW8.

Post insert signals are fed to the VCA circuits formed by amplifier IC30 and VCA's IC29 and ICE. The VCA's provide gain control and mute functions for the matrix output. Distortion is trimmed to a minimum by pre-sets VR11 and VR14. Control voltages are provided from faders RV38, RV39, CMOS switch IC38 and amplifier IC39. Pre-sets VR4 and VR16 set the nominal VCA gains to +10dB.

Control of the VCA mute functions is achieved via invertor IC40 which forms two bi-stable flip flops triggered from switches SW11 and SW12 in conjunction with capacitors C131 and 133. The flip flop outputs are fed to the CMOS switch IC38 which replaces the fader control voltages with a fixed DC level when the mute is active. The mutes can also be activated via the mute all line via resistor R201 and from the automation system via R2076 and R212.

The VCA outputs connect to differential output amplifiers IC31 and IC35. Output symmetry is adjusted by pre-sets VR12, and VR15 while high frequency stability into any load is assured by filter capacitors C90, C91, C92, C94, C107, C108, C109 and C111. Further filtering is achieved by T filters in the console frame and AC coupling is via C89, C93, C106 and C110.

The matrix signals can be sent to the solo busses via CMOS switch IC37 which is controlled by NAND gates IC34 and IC36. Sections A and C of the NAND gates form two bi-stable flip flops which are triggered by switches SW9 and SW10 in conjunction with capacitor C116 and C120. When one of the solos is first enabled capacitor C114 or C118 create a negative going pulse which is inverted and buffered by section B of the appropriate NAND gate. This will clear any other solos but is prevented from self clearing by the logic low charge held on C116 or C120; once this capacitor has charged to a logic high the solo can be cleared by the solo clear bus via section D of the NAND gate. If the solo switch is held down capacitor C113 or C117 dis-charges and resets the flip flop; the solo is now held on by diode D38 or D43 until the switch is released.

The stereo aux summing amplifier IC4 is referenced to a "clean" 0VA or noise reference which is sent from the master module to minimise crosstalk and mains born interference. Capacitors C11 and C19 provide AC coupling and capacitor/resistor networks C10, C18, R18 and R23 ensure maximum stability and high frequency rejection at all gains.

Stereo aux bus inject signals are fed via T filters in the frame to differential amplifiers IC1 and IC6. Pre-sets VR1 and VR3 provide CMR adjustment and capacitors C1, C2, C3, C4, C22, C23, C24 and C25 provide additional high frequency filtering. C5, C6, C26 and C27 provide AC coupling.

The stereo aux bus signals can be fed directly into the matrix busses from the output of amplifiers IC1 and IC6 via switch SW2. This does not effect the remaining parts of the stereo aux section which continue to function as normal. Signal levels are controlled by potentiometer RV1 and 10dB amplifier IC3 whilst the mute function is performed by switch SW1.

The stereo aux outputs are driven from differential output amplifiers IC2 and IC7. Output symmetry is adjusted by pre-sets VR2 and VR5 while high frequency stability into any load is assured by filter capacitors C13, C14, C15, C17 ,C32, C33, C34 and C36. Further filtering is achieved by T filters in the console frame and AC coupling is via C12, C16, C31 and C35.

The stereo aux signal can be sent to the solo busses via CMOS switch IC5 which is controlled by NAND gate IC8. Sections A and C of the NAND gate form a bi-stable flip flop which is triggered by switch SW3 and capacitor C40. When a solo is first enabled capacitor C38 creates a negative going pulse which is inverted and buffered by section B of IC8. This will clear any other solos but is prevented from self clearing by the logic low charge held on C40; once this capacitor has charged to a logic high the solo can be cleared by the solo clear bus via section D of IC8. If the solo switch is held down capacitor C37 dis-charges and resets the flip flop; the solo is now held on by diode D12 until the switch is released.

11. 20 led Meters.

Each led meter covers a dynamic range of 60dB and is able to monitor signals from up to six points within the console (only fully used on the group meters). The response is peak reading and the value is in dBu i.e. 0dB is 0.775 volts.

Incoming signals are attenuated by resistors R27 to R38 so that they can pass through the CMOS switch IC4. This is necessary because the switch runs off reduced voltage rails. The CMOS switch selects one of the six inputs to route to amplifier IC5 which recovers the signal voltage level and feeds to the rectifier circuit.

The input selection for CMOS switch IC4 is controlled by three lines. The pre meter change over line routes to control line A which selects between X0/X1, X2/X3, X4/X5 and X6/X7. When the control line is logic high the CMOS switch routes pre signals only. Control line B selects between X0+X1/X2+X3 and X4+X5/X6+X7. When the control line is logic high the CMOS switch routes aux return signals only (providing aux signals are selected by control line C). Control line C selects between X0+X1+X2+X3/X4+X5+X6+X7. When it is logic high aux signals are selected, if it is low group signals are selected. Control lines B and C are switched by switch SW1; programming resistors select the function of the switch as follows:-

For a left hand group meter (switching group/aux) R42 is fitted and R41 is removed.

For a right hand group meter (switching aux send/aux return) R41 is fitted and R42 is removed.

For a matrix meter both R41 and R42 are fitted.

For a master or comms meter switch SW1 is removed or dissabled.

On the group meter lines M1 and M2 are connected in left/right pairs on the group mother board so as to enable meter function switching in pairs.

The rectifier circuit is calibrated for 0dB by its input pre-set VR2. The rectifier is of a precision full wave type formed by amplifier IC3. Amplifier off-sets are adjusted out by pre-set VR1, however practical adjustments are made with a signal present at -30dB. The rectifier output charges a capacitor C6 via resistor R15 which sets the attack time; the release time is set by resistor R14. The capacitor charge is buffered and fed to the high level bar graph IC2; it is also amplified by 30dB to feed the low level bar graph IC1. Transistors Q1 and Q2 provide a stable 24 volt supply for the bar graphs to run from whilst transistors Q3 and Q4 provide constant current for the bar graph leds. this is programmed by transistor Q5 which is driven from the console led I ref bus. Transistors Q6 and Q7 provide adjustable current for the switch indicator led D21.

XL4 Technical Specification.

Input Impedance	Mic	2K Balanced
	Line	20K Balanced
Input Gain (all faders at 0dB)	Mic	Continuously variable from + 15dB to + 70dB
	Mic + Pad	Continuously variable from -5dB to + 50dB
	Channel Line Input	Continuously variable from - 20dB to + 20dB
	All other Line Inputs	0dB
Maximum Input Level	Mic	+ 6dBu
	Mic + Pad	+ 26dBu
	Channel Line Input	+ 26dBu
	All other Line Inputs	+21dBu
CMR at 1kHz	Mic (gain + 60dB)	> 70dB
	Mic + Pad (gain + 40dB)	> 50dB
	Line	> 60dB
Frequency Response (20 to 20kHz)	Mic to Mix (gain + 60dB)	+ 0dB to - 1dB
	Line to Mix	+ 0dB to - 1dB
Noise (20 to 20kHz)	Mic EIN ref. 150 Ohms (gain + 60dB)	- 129dBu
	Line EIN ref. 150 Ohms (gain + 10dB)	- 100dBu
System Noise (20 to 20kHz)	Summing Noise (12 channels routed with faders down)	- 86dB
	Line to Mix Noise (12 channels routed at 0dB, pan centre)	- 81dB
Summing Noise	(48 channels routed with faders down)	- 80dB

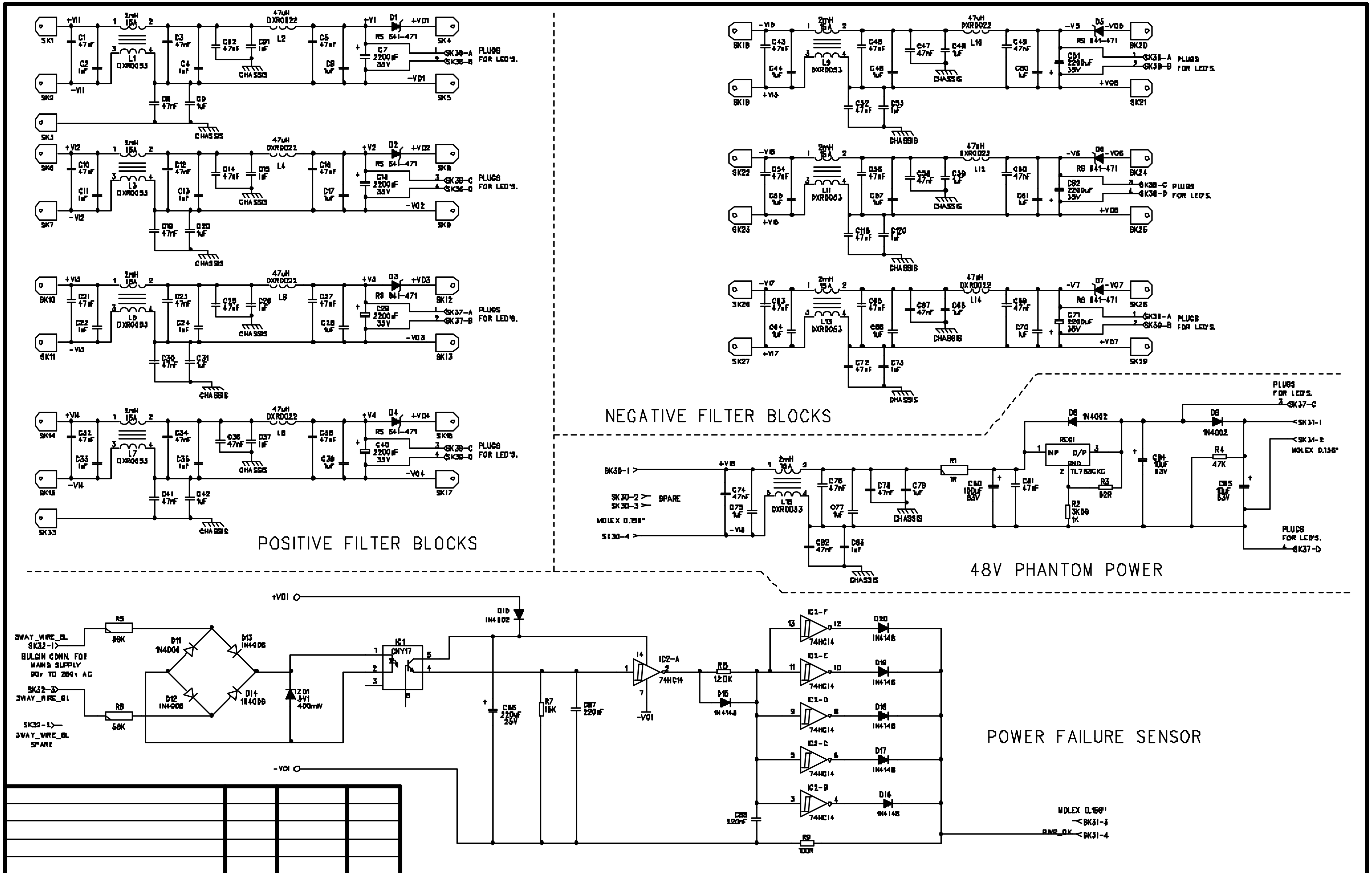
Line to Mix Noise	(48 channels routed at 0dB, pan centre)	- 75dB
Distortion at 1kHz	Mic to Mix (+ 60dB gain, 0dBu output)	< 0.03%
	Line to Mix (0dBu)	< 0.03%
Crosstalk at 1 kHz	Channel to Channel	< - 100dB
	Mix to Mix	< - 90dB
	Channel to Mix	< - 90dB
	Maximum Fader attenuation	> 90dB
Output Impedance	All Line Outputs	50 Ohms Balanced Source to drive > 600 Ohms
	Headphones	To drive > 8 Ohms Unbalanced
	Comms (Bi - directional)	600 Ohms Nominal Unbalanced
Maximum Output Level	All Line Outputs	+ 21dBu
	Headphones	+ 21dBu (8W into 8 Ohms)
	Comms (Bi - directional)	- 10dBu
Nominal Signal Level	Mic	- 70dBu to + 5dBu
	Channel Line Inputs	- 20dBu to +5dBu
	All other Line Inputs and Outputs	0dBu
	Headphones	+ 10dBu
	Comms	- 20dBu
	Comms and Talk Mic	- 50dBu to - 20dBu (auto gain)
Headroom at all stages	Comms, Talk and Headphone	> 10dB
	All other signals	> 20dB
Metering	Type	20 led peak reading
	Range	- 36dBu to + 21dBu

	Colour Green	Up to + 9dBu Normal signal
	Colour Yellow	+ 12dBu to + 15dBu High signal
	Colour Red	Over + 18dBu Signal Too High
	Quantity	77 (Monitoring all main inputs and outputs)
Equaliser	Low pass slope	12dB / Oct.
	Low pass frequency	Continuously variable - 3dB point from 1K to 40K
	Hi pass slope	12dB / Oct.
	Hi pass frequency	Continuously variable - 3dB point from 10Hz to 400Hz
	Treble Gain	Continuously variable + 15 dB to - 15 dB Centre detent = 0dB
	Treble Shelving Freq.	Continuously variable 3dB point from 1K to 20K
	Treble Bell Freq.	Continuously variable centre from 1K to 20K
	Treble Bell Bandwidth	Continuously variable 0.1 Oct. to 2 Oct. Centre detent = 0.5 Oct.
	Hi Mid Gain	Continuously variable + 15 dB to - 15 dB Centre detent = 0dB
	Hi Mid Freq.	Continuously variable centre from 400Hz to 8K
	Hi Mid Bandwidth	Continuously variable 0.1 Oct. to 2 Oct. Centre detent = 0.5 Oct.
	Lo Mid Gain	Continuously variable + 15 dB to - 15 dB Centre detent = 0dB
	Lo Mid Freq.	Continuously variable centre from 100Hz to 2K
	Lo Mid Bandwidth	Continuously variable 0.1 Oct. to 2 Oct. Centre detent = 0.5 Oct.

Bass Gain	Continuously variable	
		+ 15 dB to - 15 dB Centre detent = 0dB
	Bass Shelving Freq.	Continuously variable 3dB point from 20Hz to 400Hz
	Bass Bell Freq.	Continuously variable centre from 20Hz to 400Hz
	Dimensions	Width 2176 mm Depth 1120 mm Height 420 mm
	Nett Weight	229kg
	Shipping Weight	412kg

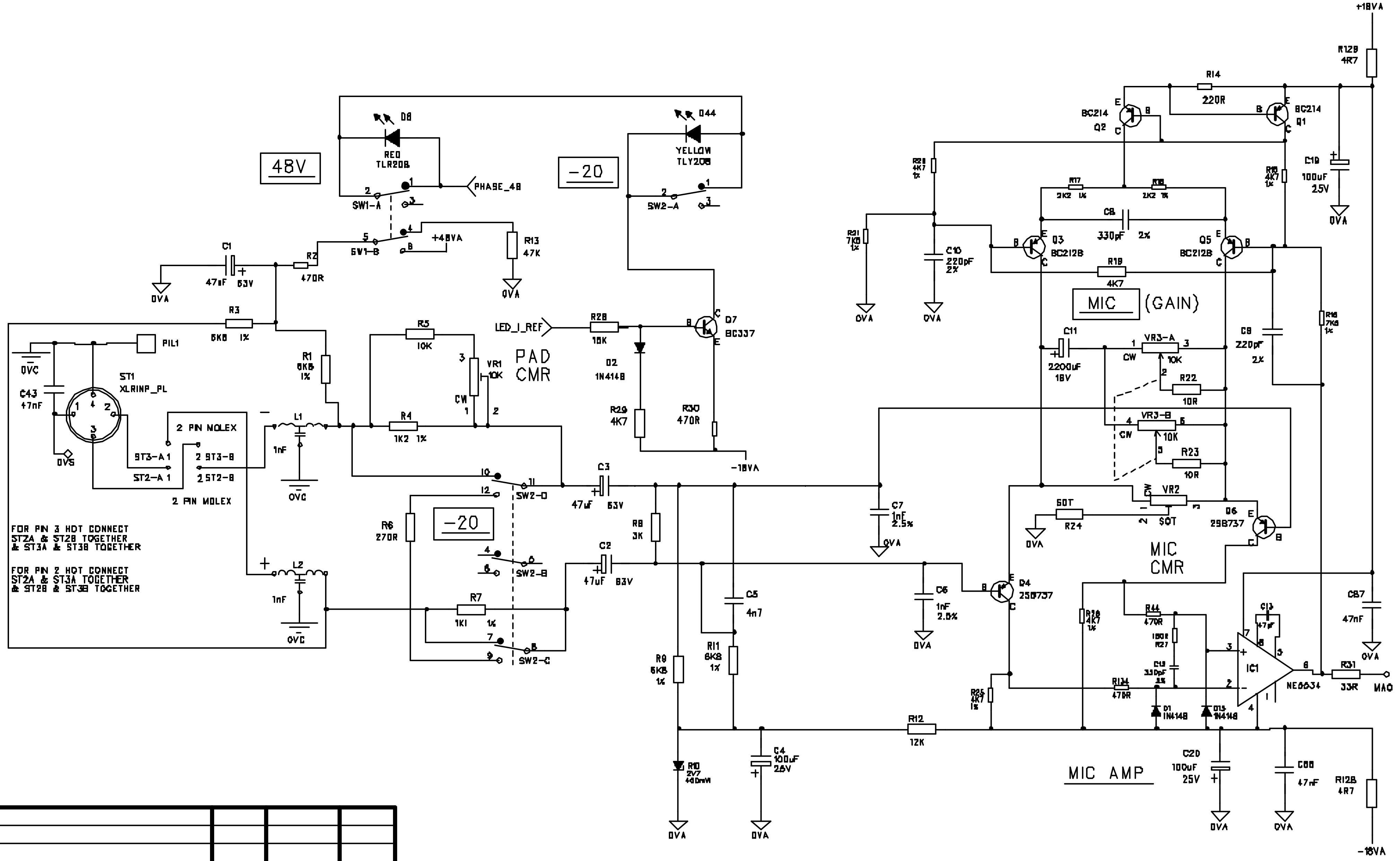
XL490-02	Power supply LED board
XL490-01	Power supply filter board
XL402-1	Input pod
XL402-2	Input pod
XL402-3	Input pod
XL402-4	Input pod
XL402-5	Input pod
XL401-1	Input module - Input, inserts & EQ
XL401-2	Input module - VCA, muting & direct out
XL401-3	Input module - Pan, VCA & aux buffers
XL401-4	Input module - Aux sends
XL401-5	Input module - LED and FET drivers
XL401-6	Input module - Switch & data codec
XL401-7	Input module - Equaliser section
XL401-8	Input module - Main connectors & PSU
XL405-1	Stereo Input Pod (Mic amp)
XL405-2	Stereo Input Pod (Filters)
XL405-3	Stereo Input Pod (Meters)
XL404-1	Stereo Input Module (Input, inserts & EQ)
XL404-2	Stereo Input Module (VCA, muting & direct out)
XL404-3	Stereo Input Module (Pan, VCA & Aux buffers)
XL404-4	Stereo Input Module (Aux sends)
XL404-5	Stereo Input Module (LED & FET drivers)
XL404-6	Stereo Input Module (Switch & data codec)
XL404-7	Stereo Input Module (Left channel equaliser)
XL404-8	Stereo Input Module (Right channel equaliser)
XL404-9	Stereo Input Module (Main connectors & PSU)
XL411-1	Group module - Aux return
XL411-2	Group module - Aux return
XL411-3	Group module - Aux return
XL411-4	Group module - Bus summing & aux send
XL411-5	Group module - Aux send & group
XL411-6	Group module - Group
XL411-7	Group module - Group
XL411-8	Group module - Edge connectors & decoupling
XL414-1	Group Module - Aux return
XL414-2	Group Module - Aux return
XL414-3	Group Module - Aux return
XL414-4	Group Module - Bus summing & aux send
XL414-5	Group Module - Aux send & group
XL414-6	Group Module - Group
XL414-7	Group Module - Group
XL414-8	Group Module - Edge connectors & decoupling
XL421-1	Master module - Master & Talk Inputs
XL421-2	Master module - Inserts
XL421-3	Master module - Inserts & VCA control
XL421-4	Master module - Mutes & solo switching
XL421-5	Master module - Record section
XL421-6	Master module - Meters

XL421-7	Master module - Main connectors & PSU
XL431-1	Comms module - VCA control voltage & talk mic
XL431-2	Comms module - VCA control voltage & talk mic
XL431-3	Comms module - Talk ext, send, call, pink noise & osc
XL431-4	Comms module - Solo, I/P & O/P
XL431-5	Comms module - Solo and automutes
XL431-6	Comms module - Solo,edge connectors,LED chain current source and decoupling
XL441-1	Matrix module - Bus summing and insert send
XL441-2	Matrix module - Global pre switching
XL441-3	Matrix module - VCA's solo insert return and output
XL441-4	Matrix module - VCA control voltage and mute
XL441-5	Matrix module - Aux sends
XL441-6	Matrix module - Aux sends,decoupling and edge connectors
XL4	20 LED switching
XL4	I/O XLR P.C.B
XL4	Jack bay field
XL4	Jack bay field
XL4.MTX1	MTX mother upper connectors
XL4.MTX.2	MTX mother lower connectors
XL4_IP1	IP mother upper connectors
XL4_IP2	IP mother lower connectors
XL4.IP3	IP mother IDC connectors
XL4.IP1	IP mother upper connectors
XL4.GP2	GP mother upper connectors
XL4.GP3	GP mother lower connectors
XL4.GP4	GP mother lower connectors
XL4.GP5	GP mother mid connectors



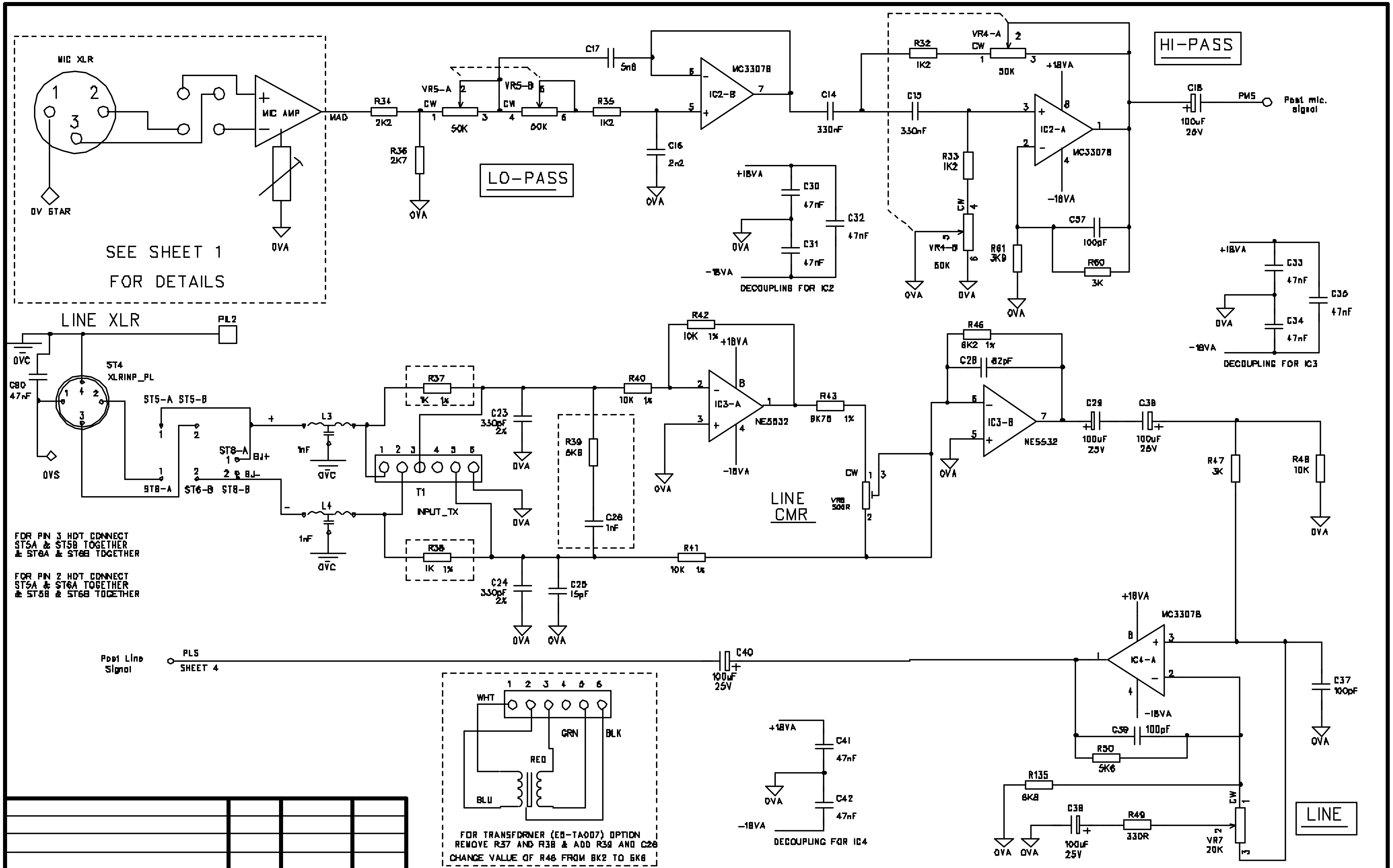
UNIT: XL490-01		MIDAS AUDIO	
TITLE: POWER SUPPLY FILTER BOARD	DRAWN: JRC	DATE: 3-1-95	SHEET: 1 OF 1
BOARD No. B2798 BOARD Iss. PR2	CHECKED:	SHEET Iss: PR2	DRG No. ?

AMMENDMENTS	ISS.	INIT.	DATE.



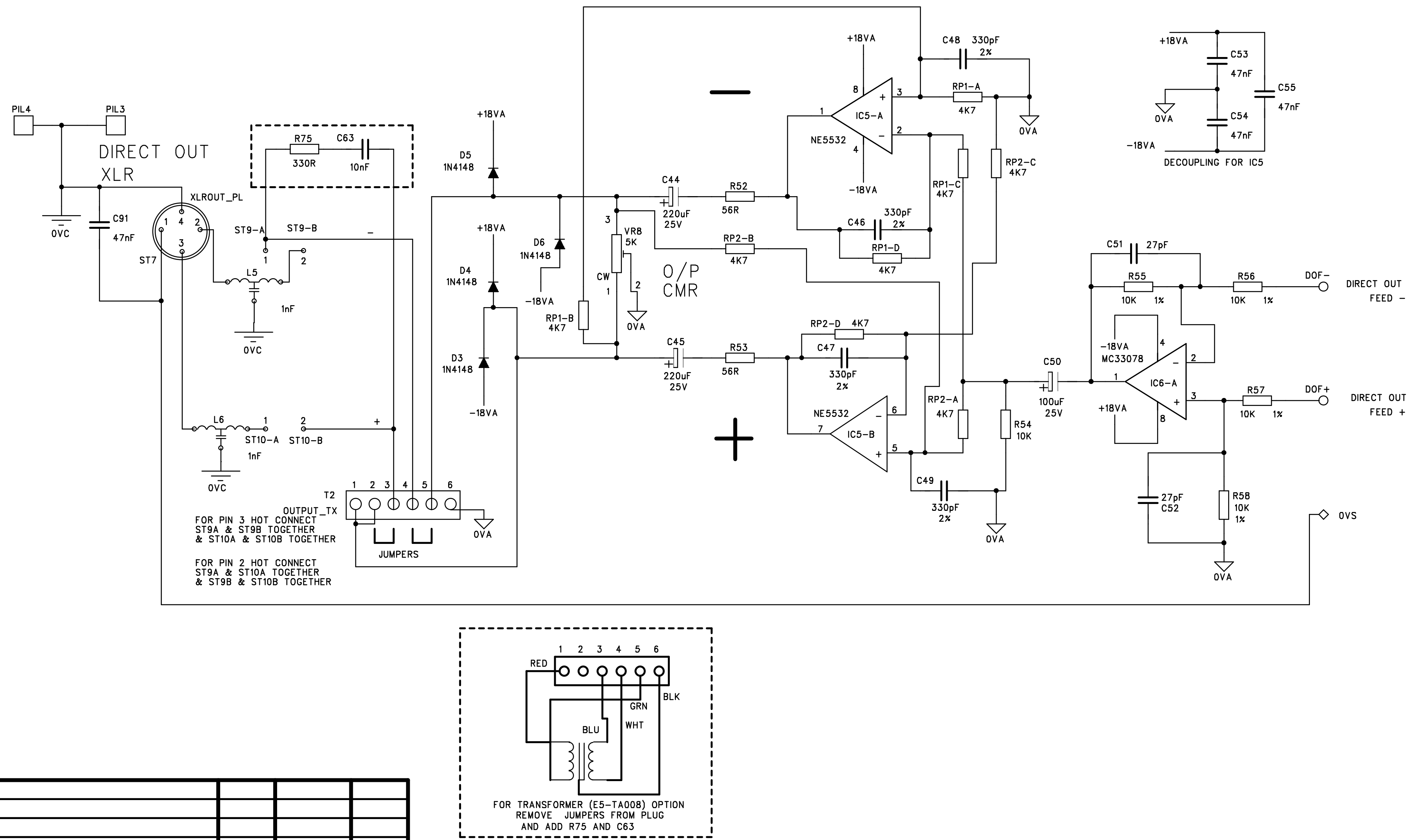
CHANGE R10 TO A 2V7 ZENER DIODE	5	JRC.	27/8/96
CHANGE R13,16,17,18,20,21,23&28 TO 1% TOLERANCE	6	JRC.	27/8/96
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL402	MIDAS AUDIO		
TITLE: INPUT POD	DRAWN: JRC.	DATE: DEC 95	SHEET: 1 OF 5
BOARD No. B2767 BOARD iss. 2	CHECKED:	SHEET iss. 5	DRG No. XL402.SCH



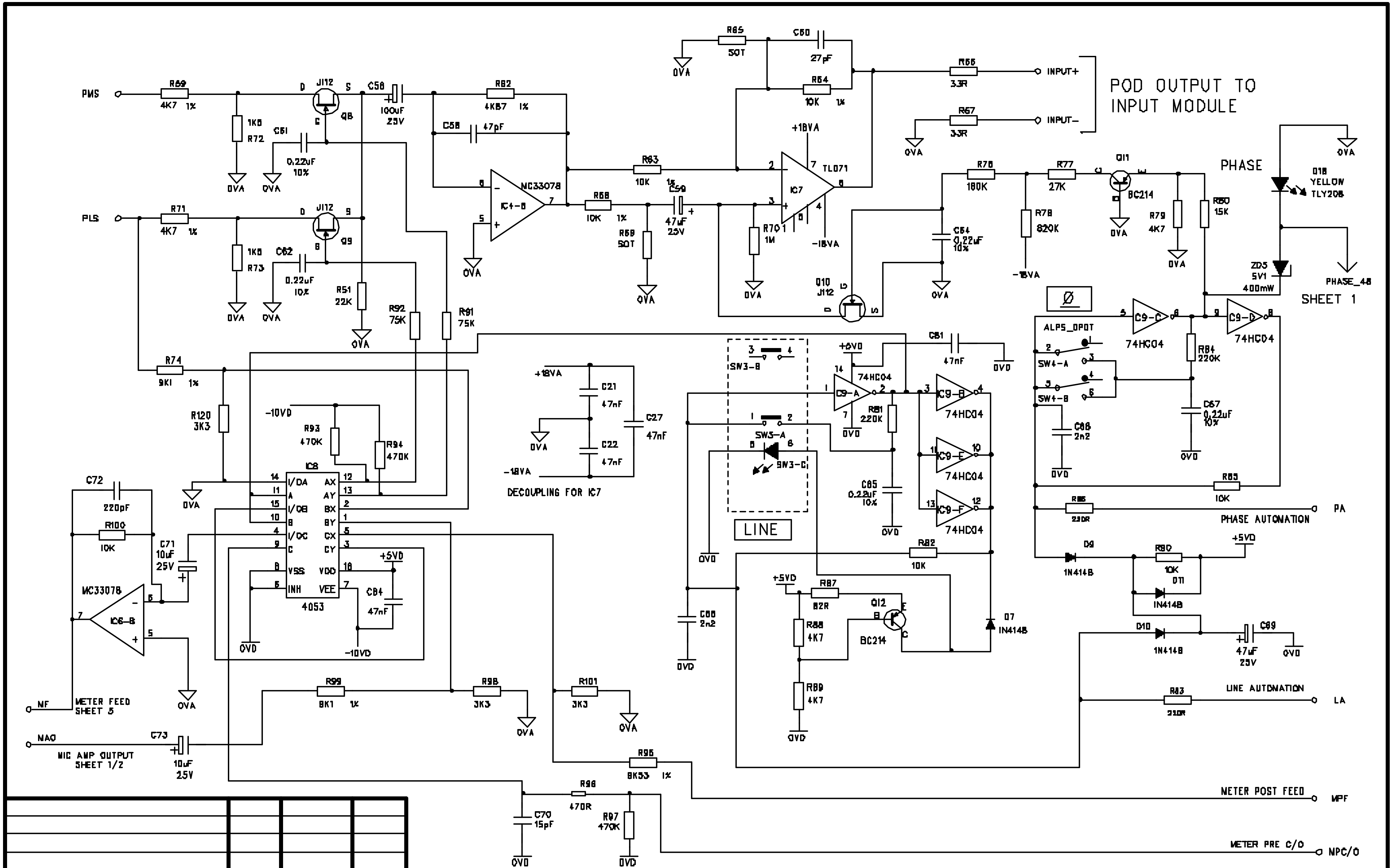
ANMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL402	MIDAS AUDIO		
TITLE: INPUT POD	DRAWN: JRC.	DATE: DEC 95	SHEET: 2 OF 5
BOARD No. B2767 BOARD iss. 2	CHECKED:	SHEET iss. 5	DRG No. XL402.SCH



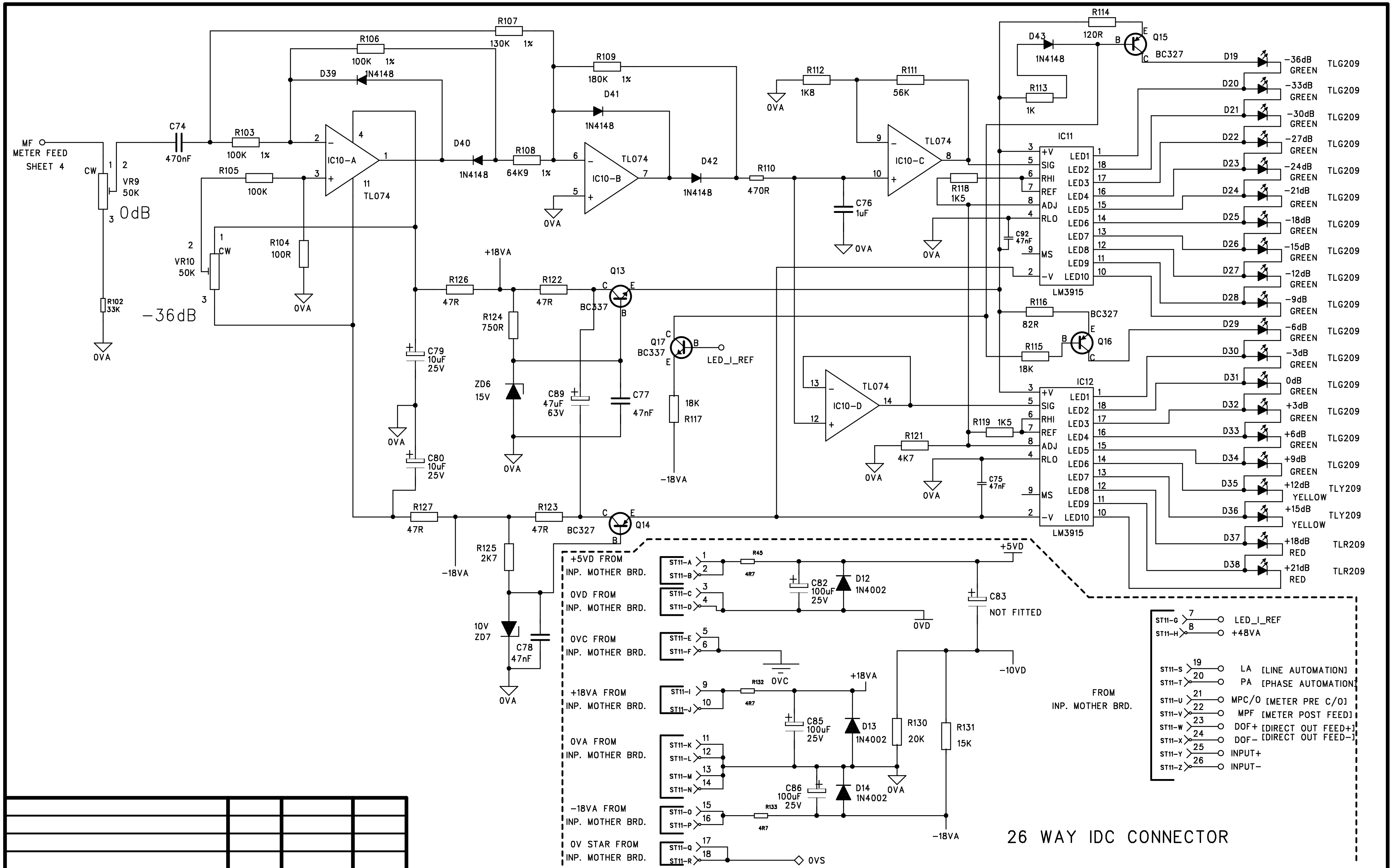
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL402	MIDAS AUDIO		
TITLE: INPUT POD	DRAWN: JRC.	DATE: DEC 95	SHEET: 3 OF 5
BOARD No. B2767 BOARD iss. 2	CHECKED:	SHEET iss. 5	DRG No. XL402.SCH



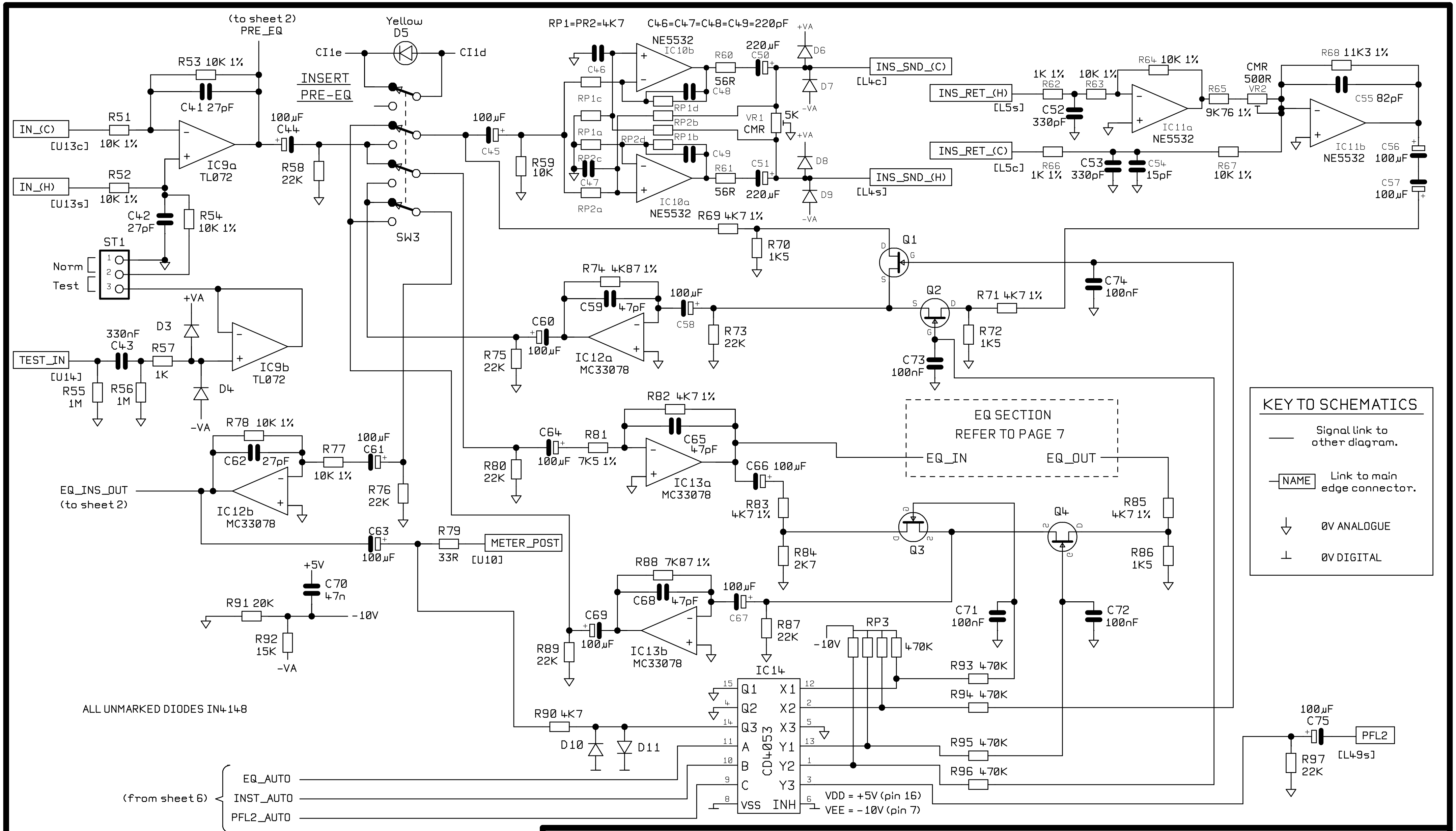
CHANGE C66 & C68 FROM 100pF TO 2n2	4	JRC.	4-12-95
CHANGE R83 & R85 FROM 100R TO 220R	4	JRC.	4-12-96
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL402	MIDAS AUDIO		
TITLE: INPUT POD	DRAWN: JRC.	DATE: DEC 95	SHEET: 4 OF 5
BOARD No. B2767 BOARD iss. 2	CHECKED:	SHEET iss. 5	DRG No. XL402.SCH



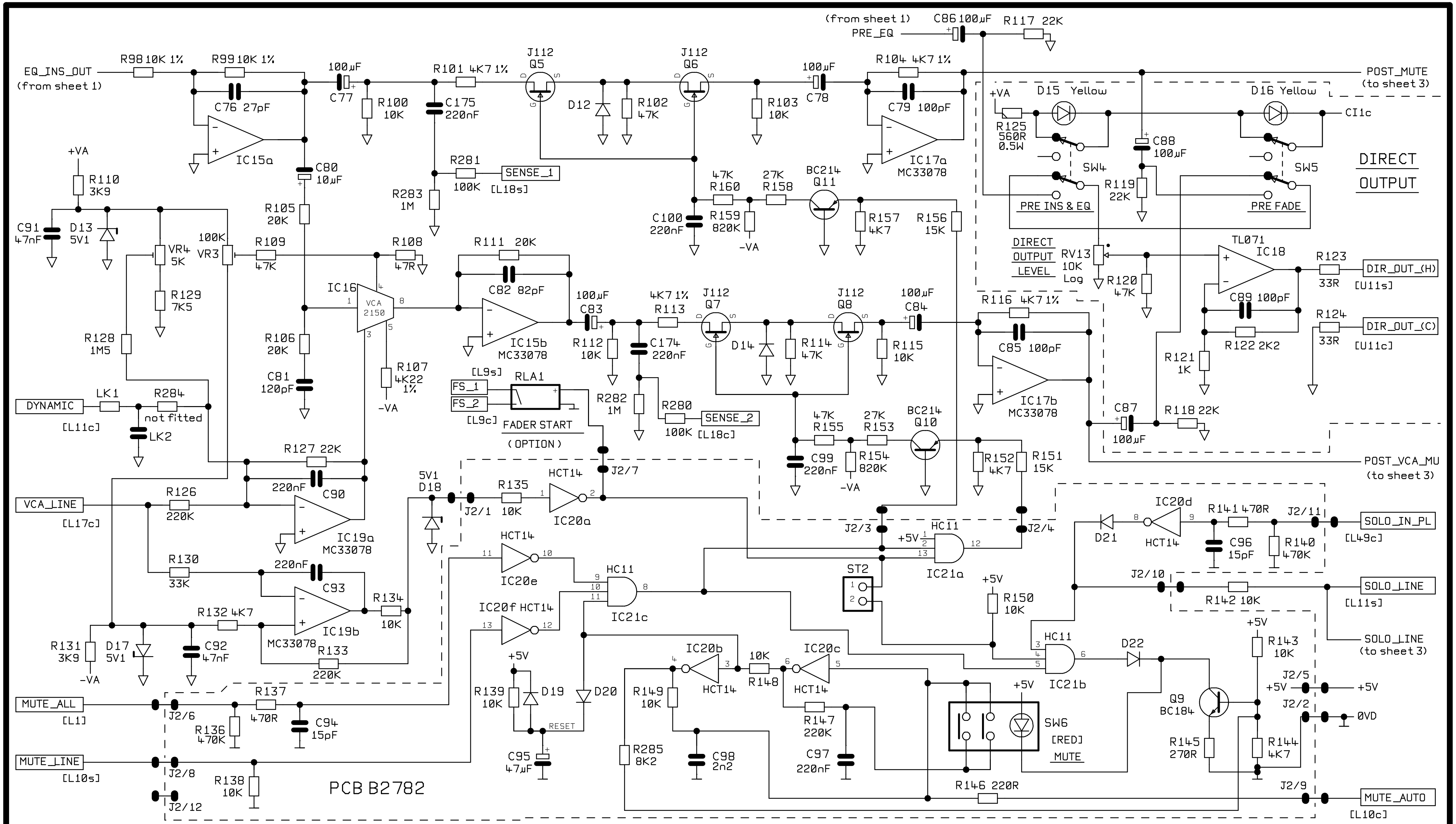
AMMENDMENTS	ISS.	INIT.	DATE.
CHANGE R102 from 56K to 33K	5	JRC	AUG 96
CHANGE VALUE OF C83 FROM 10uF TO NOT FITTED	3	JRC	OCT 95
CHANGE D36 & D35 TO D1-AY207 (LEDY207)			
CHANGE C61 & C62 TO 0.1uF 5%			
CHANGE R91 & R92 TO 470K 5%			

UNIT: XL402		MIDAS AUDIO	
TITLE: INPUT POD	DRAWN: JRC.	DATE: DEC 95	SHEET: 5 OF 5
BOARD No. B2767 BOARD iss. 2	CHECKED:	SHEET iss. 5	DRG No. XL402.SCH



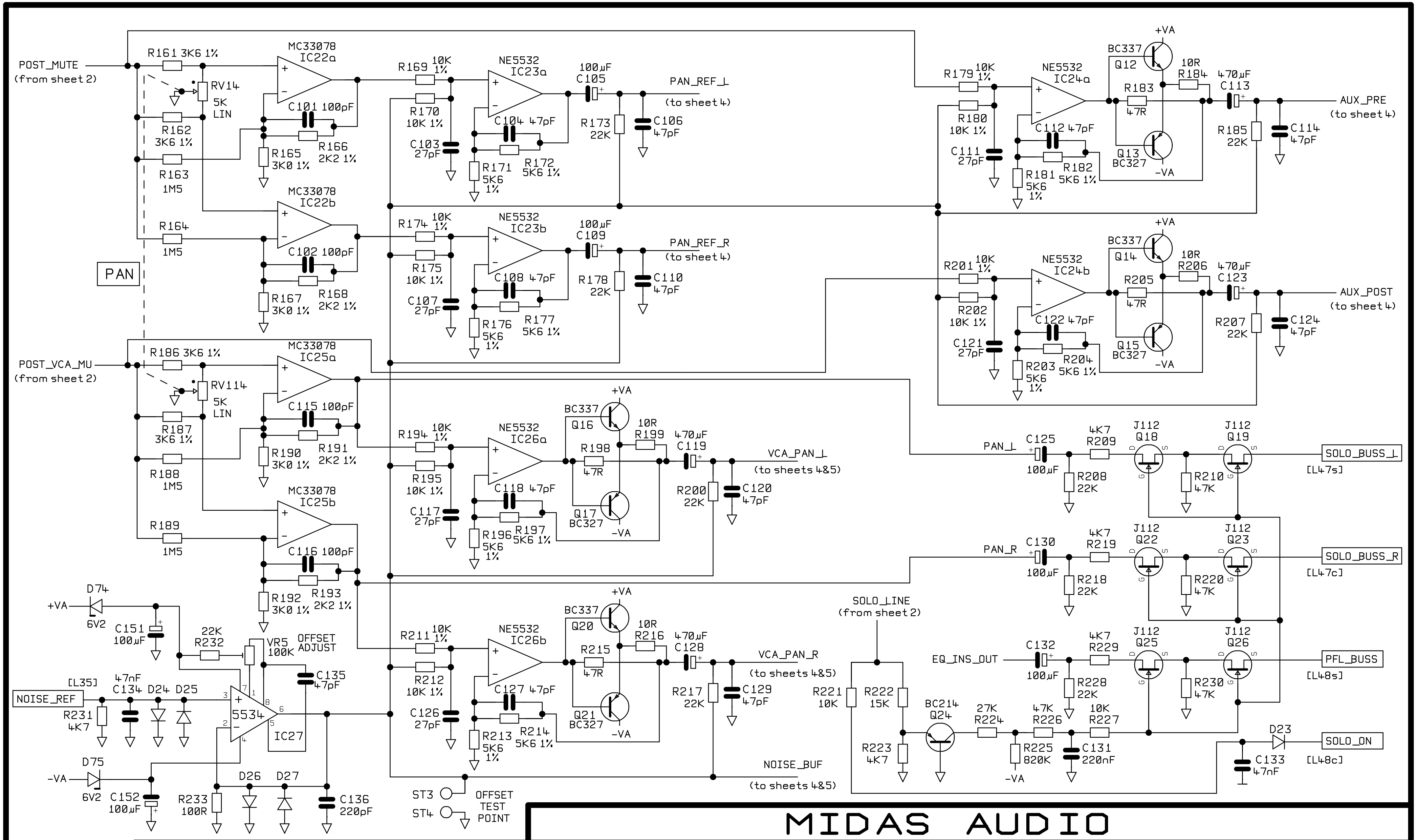
MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL401 INPUT MODULE	INPUT, INSERTS & EQ	1 OF 8
BOARD No. B2773 issue3	DWG No. XL401_1.DGM	DWG. ISSUE: 5	DATE: 23.8.96	



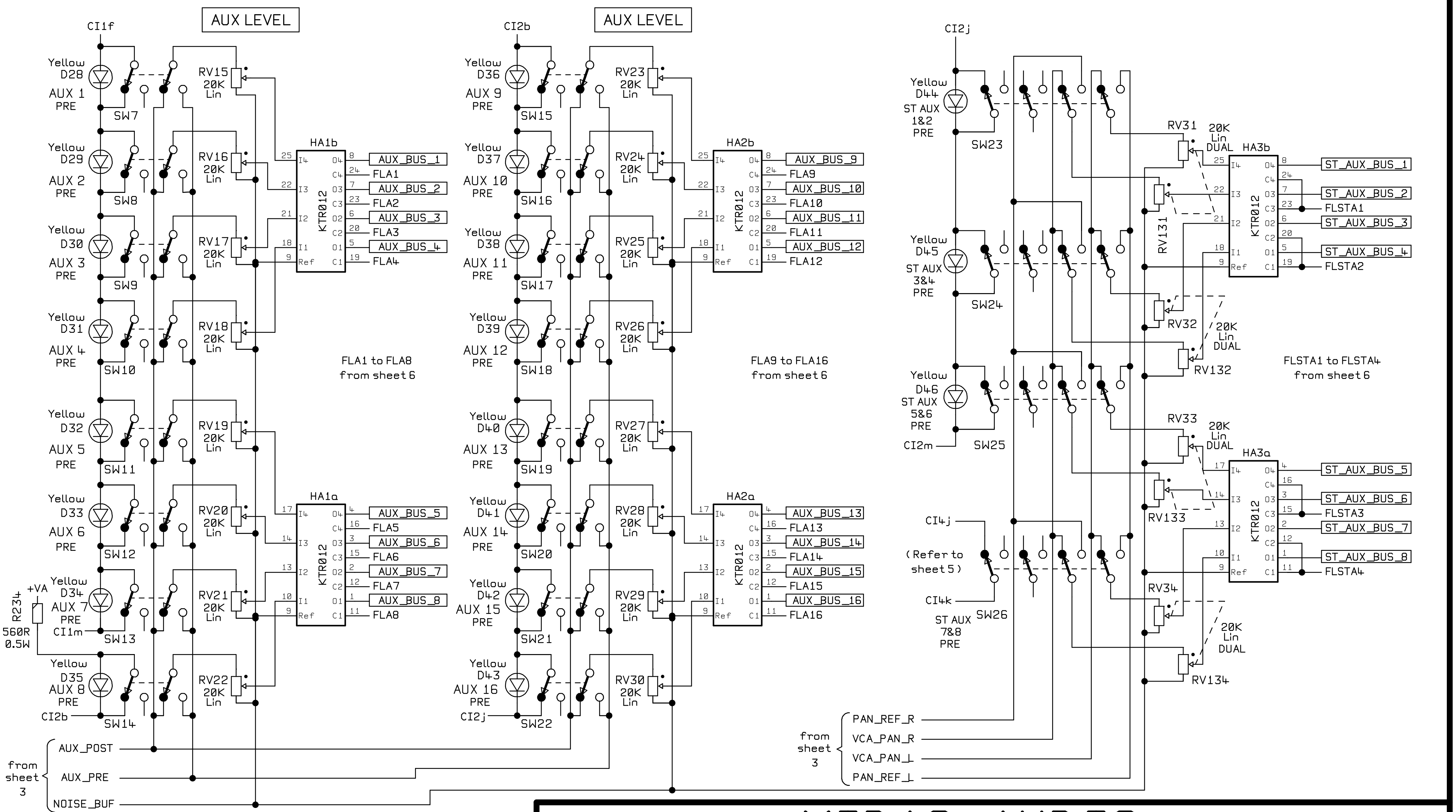
MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL401 INPUT MODULE	VCA, MUTING & DIRECT OUT
BOARD No. B2773 & B2782	DWG No. XL401_2.DGM	DGW. ISSUE: 5	DATE: 23.8.96



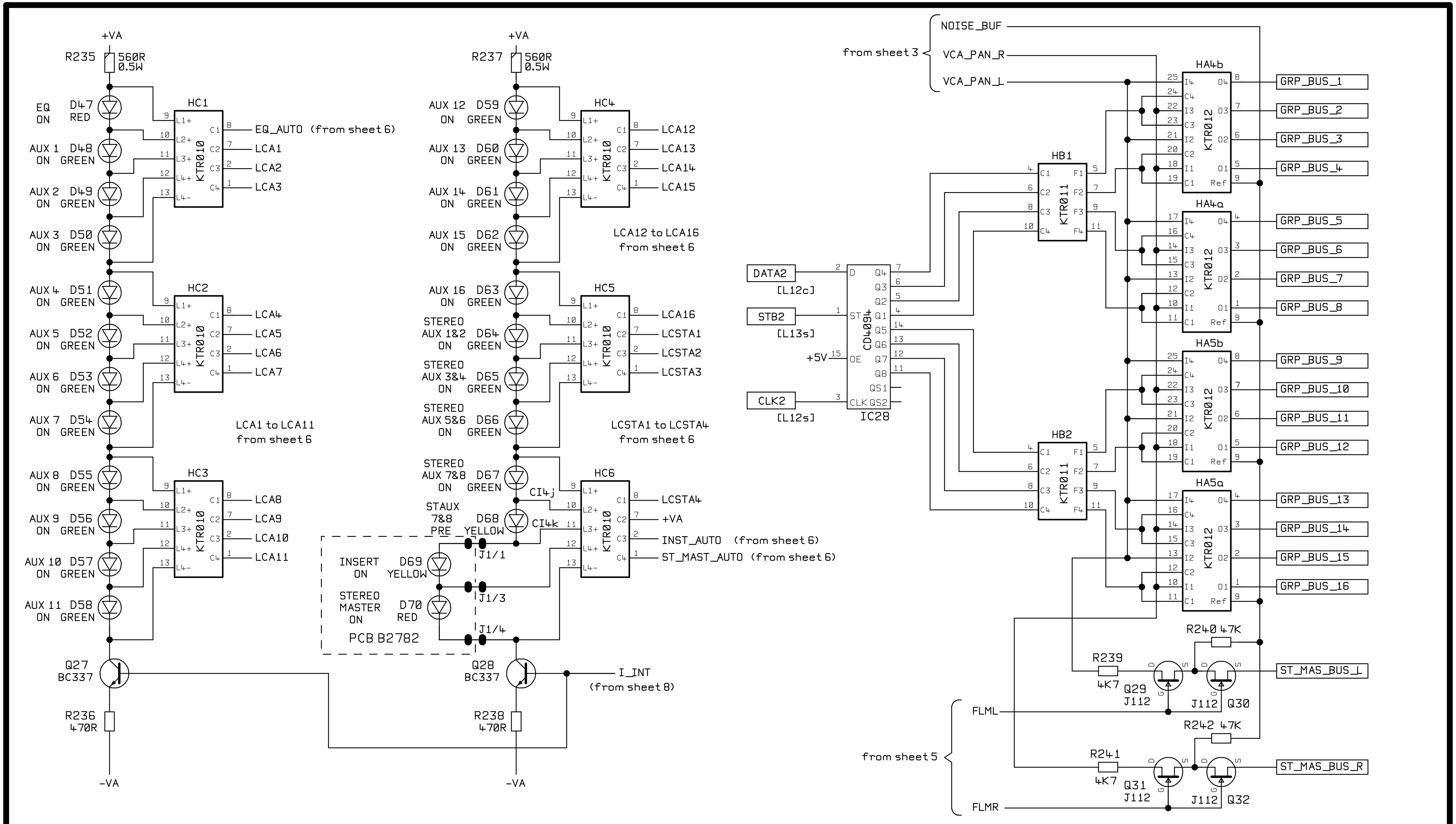
MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL401 INPUT MODULE	PAN, VCA & AUX BUFFERS	3 OF 8
BOARD No. B2773 issue 3		DWG No. XL401_3.DGM	DWG. ISSUE: 5	DATE: 23.8.96



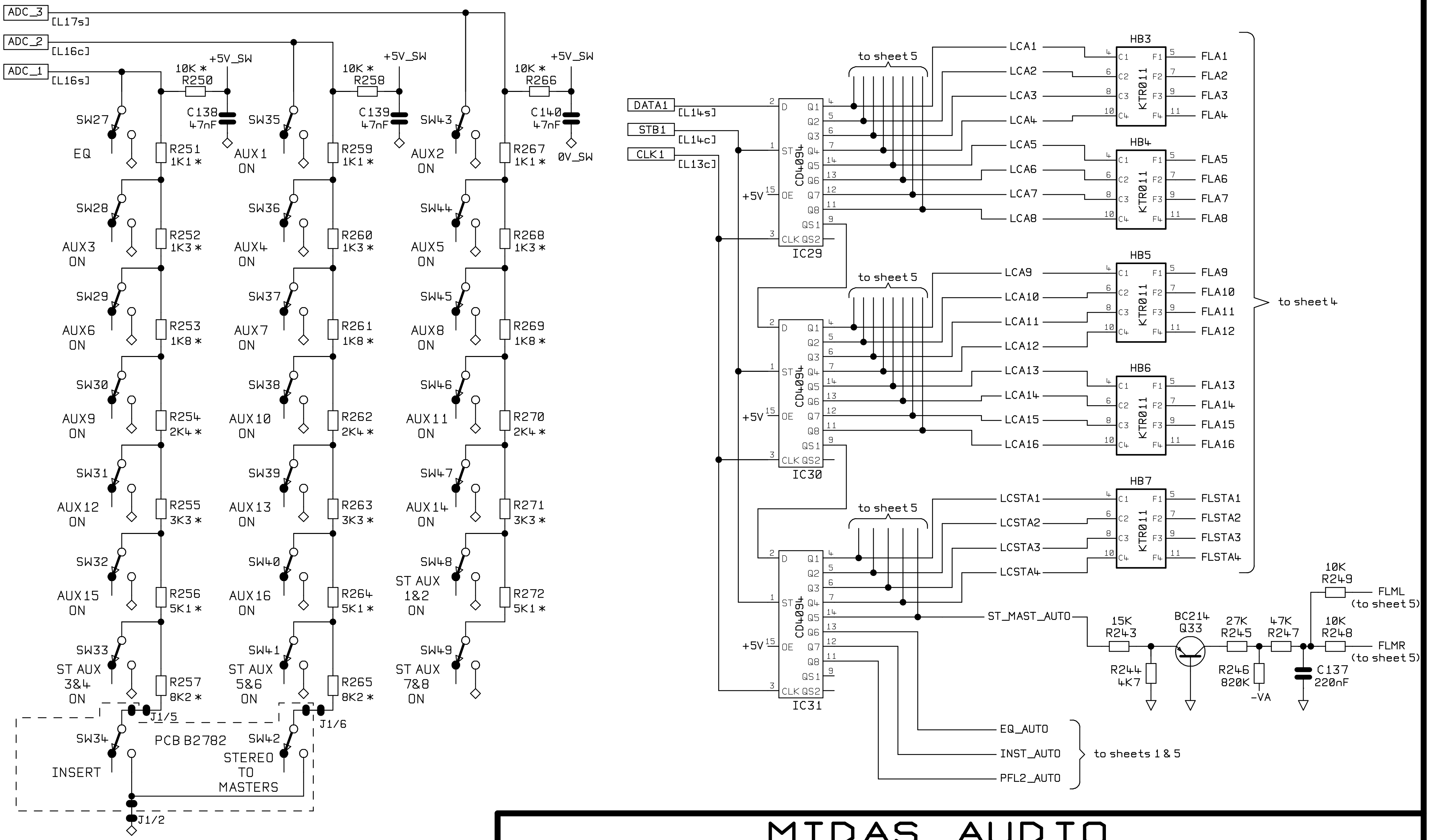
MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL401 INPUT MODULE	AUX SENDS	4 OF 8
BOARD No. B2773 issue 3	DWG No. XL401_4.DGM	DWG. ISSUE: 5	DATE: 23.8.96

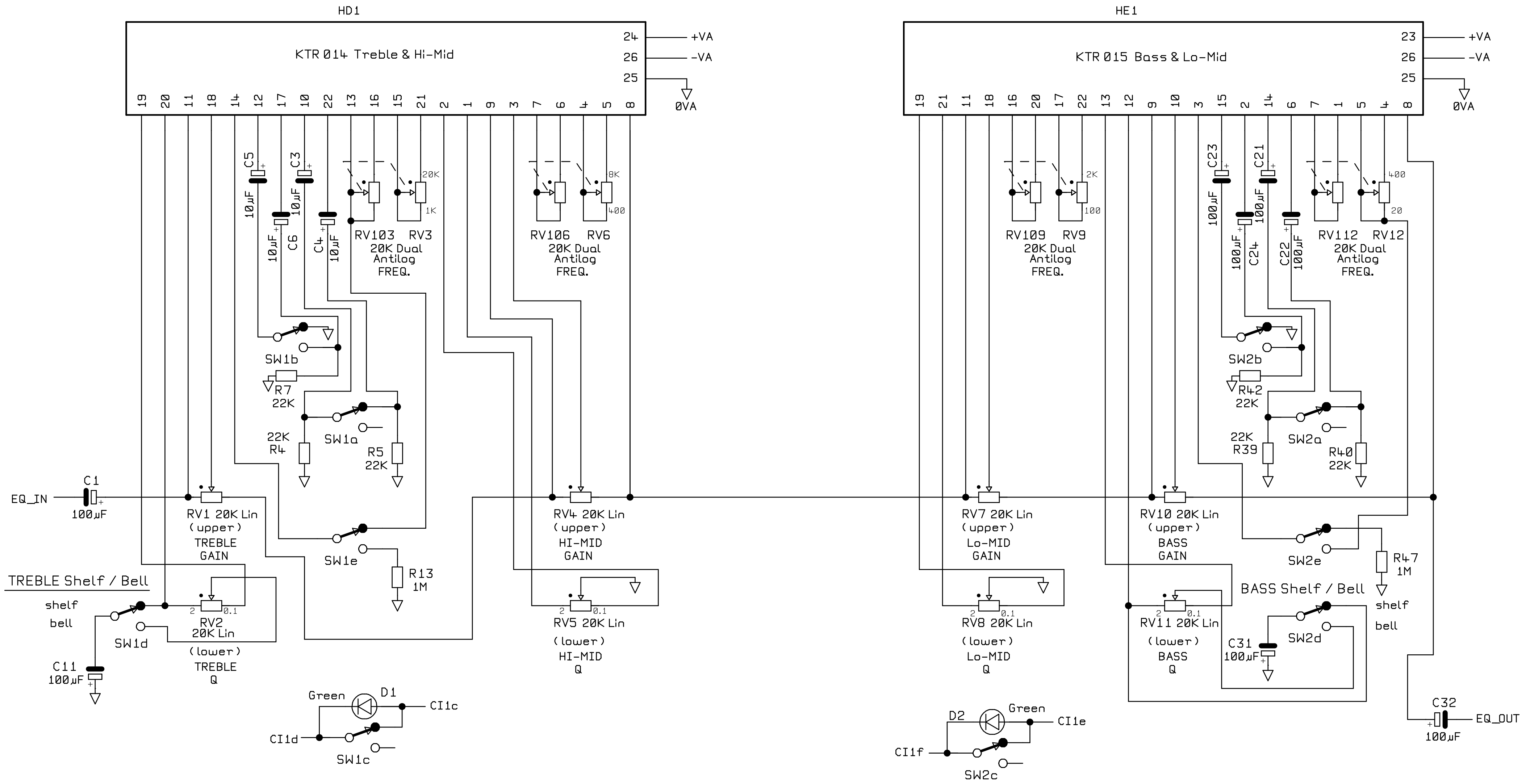


MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL401 INPUT MODULE	LED & FET DRIVERS
BOARD No. B2773 & B2782	DWG No. XL401_5.DGM	DWG. ISSUE: 5	DATE: 23.8.96

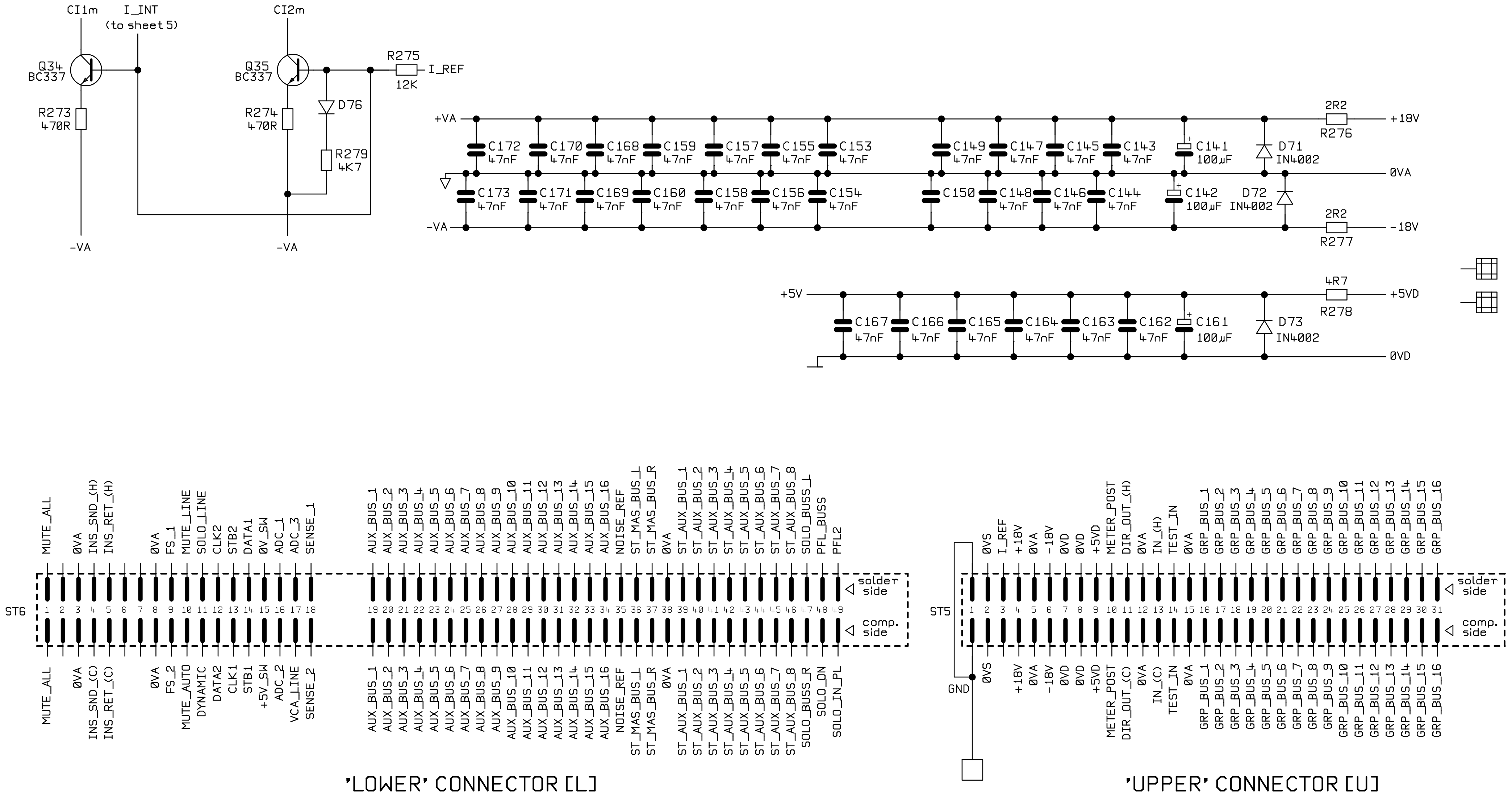


		MIDAS AUDIO	
Drawn: DGT	Checked: A.C	XL401 INPUT MODULE	SWITCH & DATA CODEC	6 OF 8
BOARD No. B2773 & B2782	DWG No. XL401_6.DGM	DWG. ISSUE: 5	DATE: 23.8.96



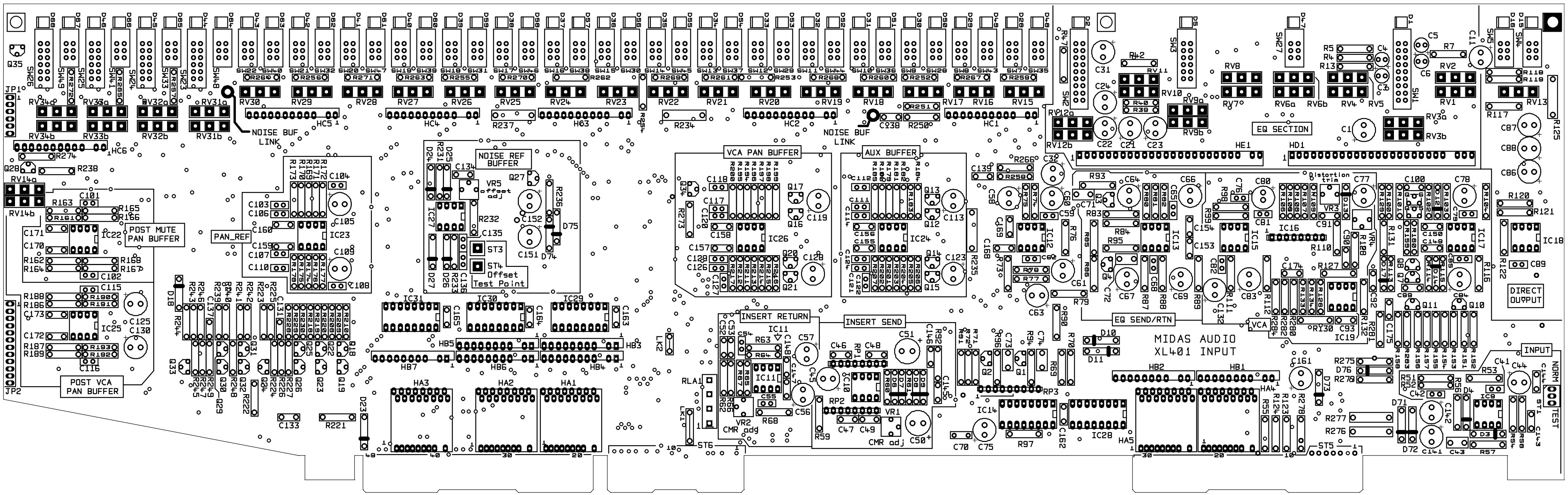
MIDAS AUDIO

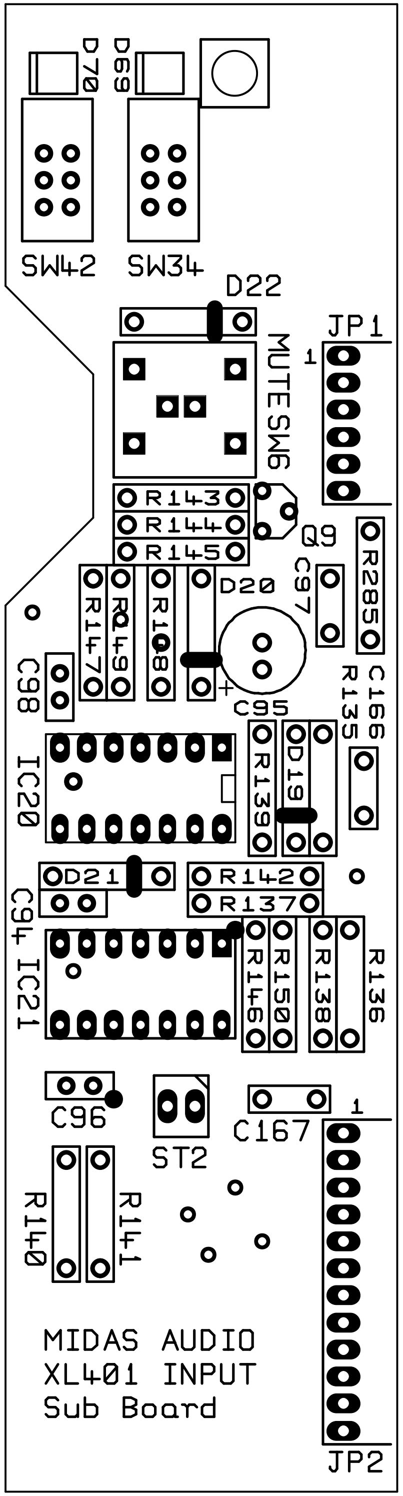
Drawn: DGT	Checked: A.C	XL401 INPUT MODULE	EQUALISER SECTION
BOARD No. B2773 issue 3	DWG No. XL401_7.DGM	DWG. ISSUE: 5	DATE: 23.8.96

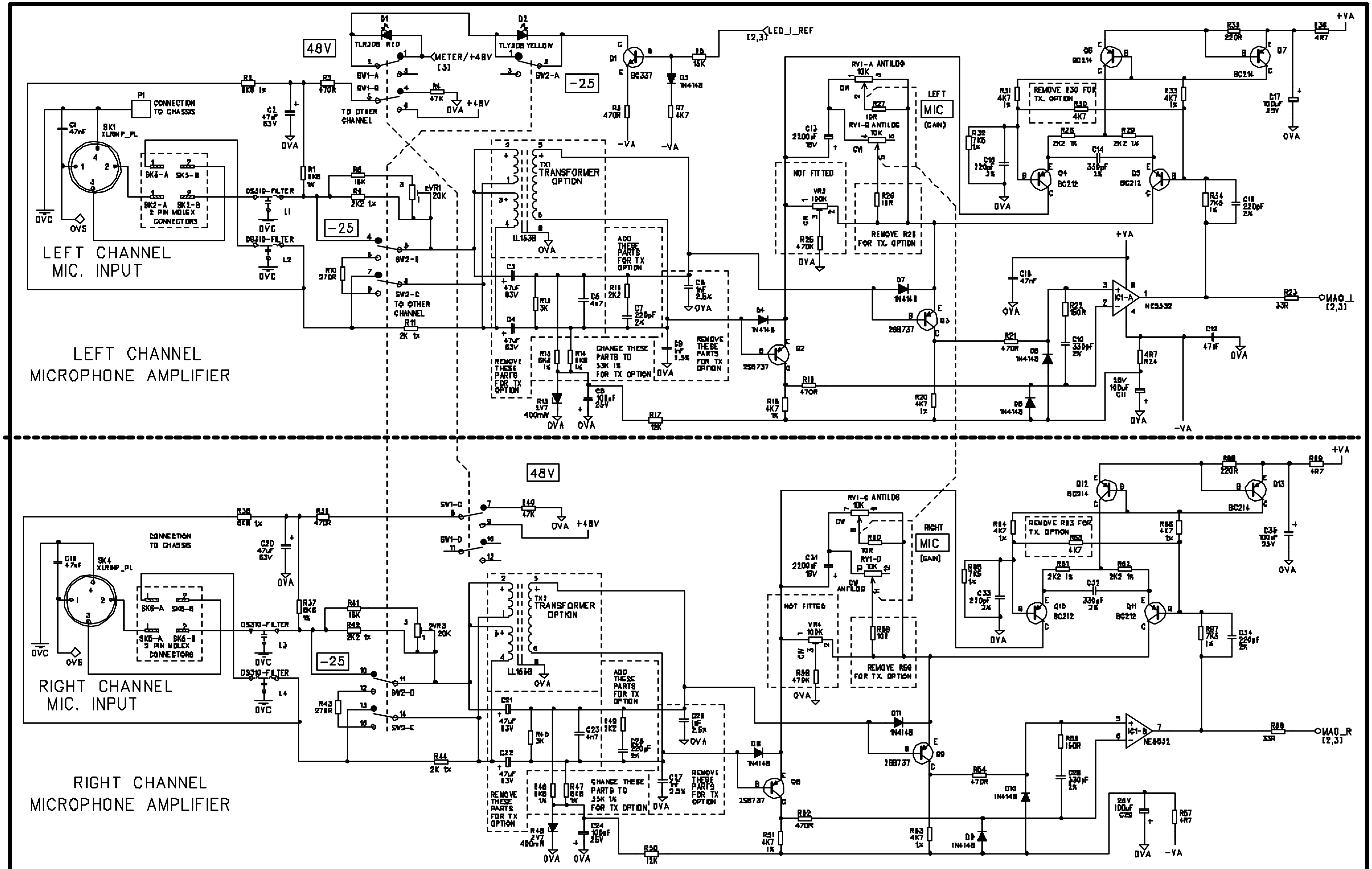


MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL401 INPUT MODULE	MAIN CONNECTORS & PSU
BOARD No. B2773 issue 3	DWG No. XL401_8.DGM	DWG. ISSUE: 5	DATE: 23.8.96

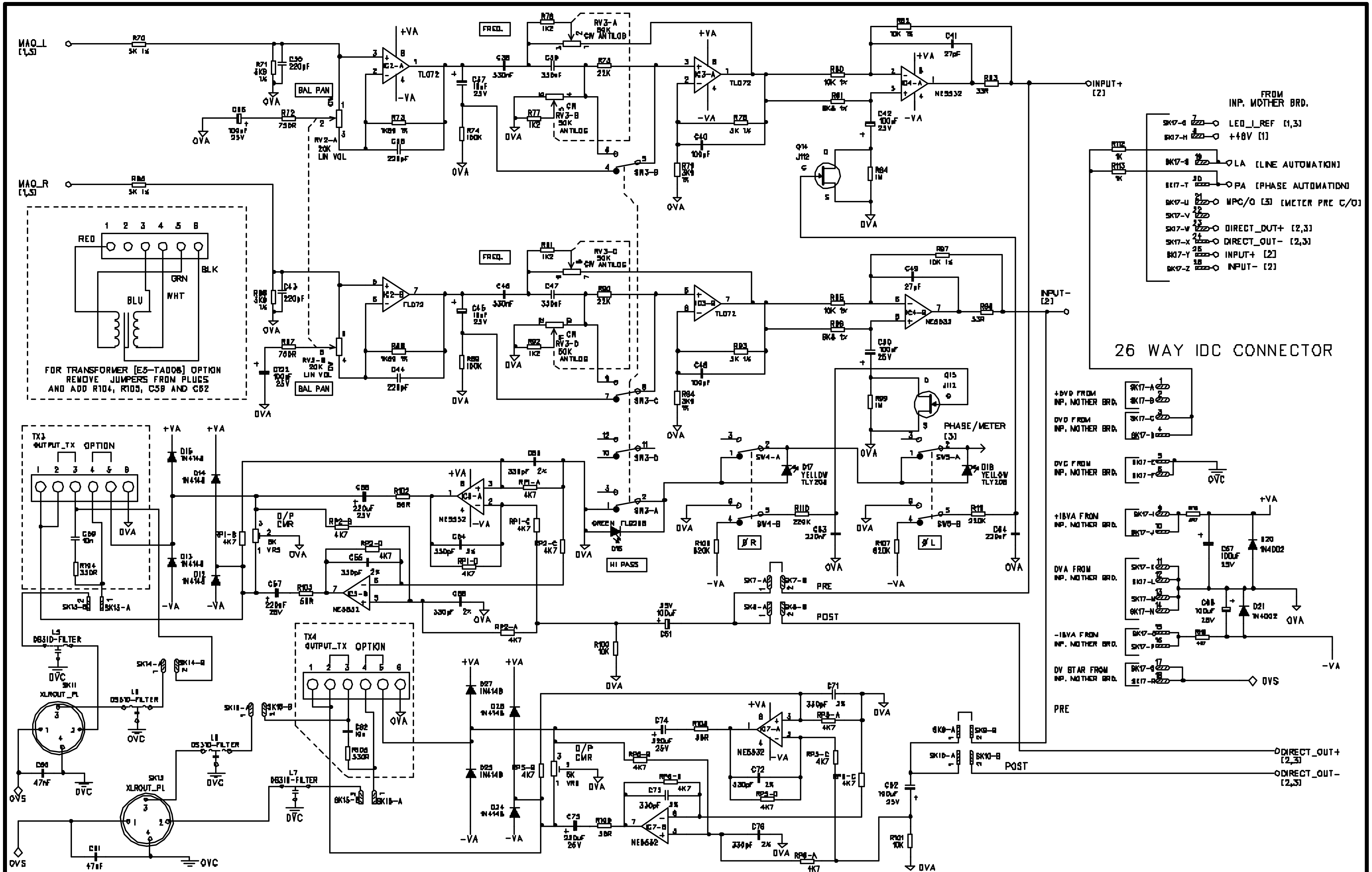

MIDAS AUDIO
XL401 INPUT
NOISE BUF LINK
NOISE BUF LINK
NOISE REF BUFFER
Offset Test Point
VCA PAN BUFFER
AUX BUFFER
EQ SECTION
EQ SEND/RTN
DIRECT OUTPUT
POST MUTE PAN BUFFER
PAN_REF
POST VCA PAN BUFFER
INSERT RETURN
INSERT SEND
CMR adj
INPUT
NORM
TEST
Distortion trim


D70
D69
SW42
SW34
D22
JP1
1
MUTE SW6
R143
R144
R145
Q9
R285
C97
D20
R147
C98
C95
R135
C166
IC20
R139
D19
D21
R142
R137
C94
IC21
R146
R150
R138
R136
C96
ST2
C167
1
R140
R141
MIDAS AUDIO
XL401 INPUT
Sub Board
JP2

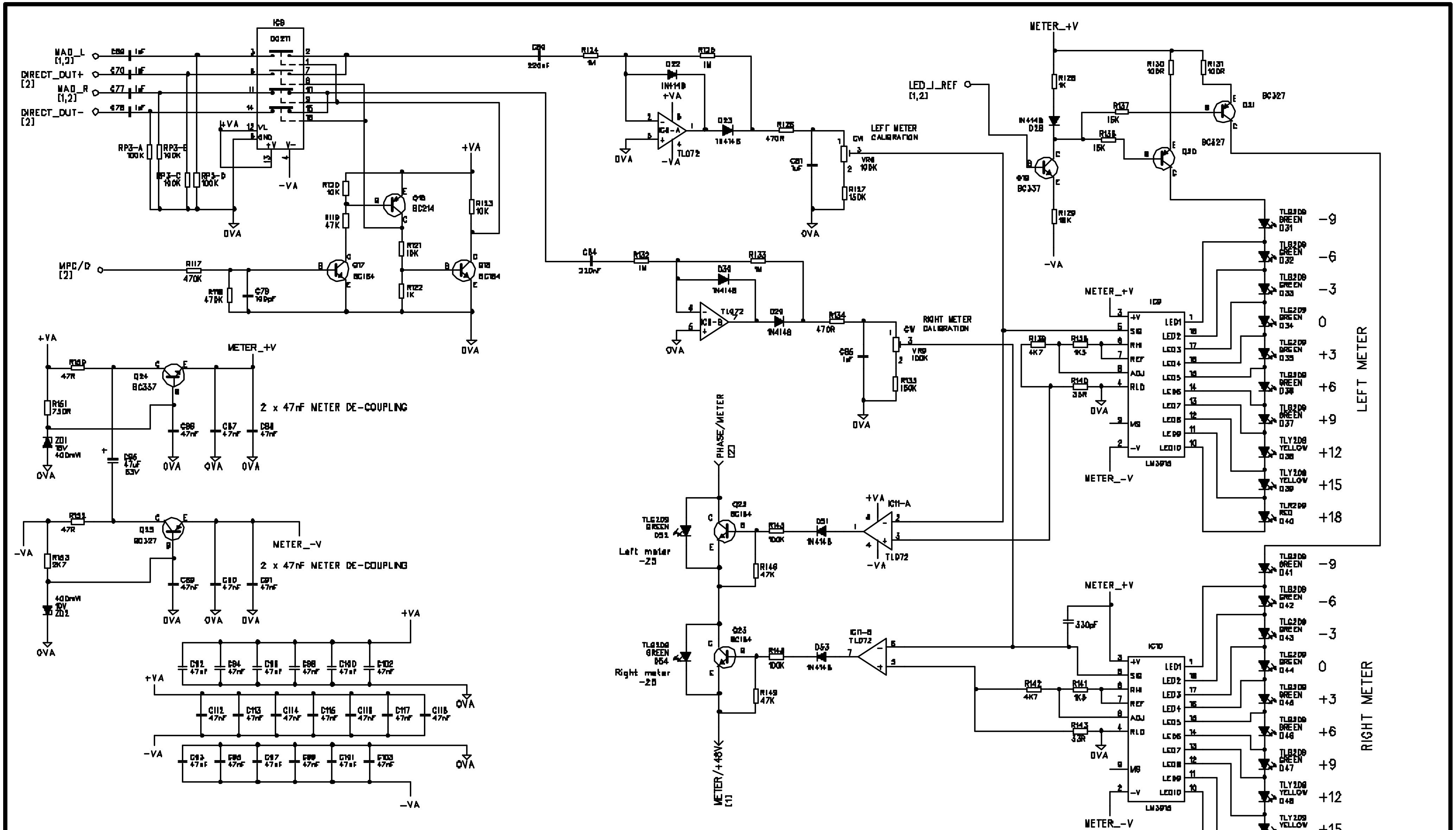


Previous issue amended from 2 to 1.2		AA	18/01/01
Changed R18,R20,R31,R33,R51,R53,R64 & R66 TO 1% TOL. Changed R32,R34,R85 & R87 TO 1% TOL.	1.2	JRC.	30/9/96
Changed R26,R28,R61 & R62 TO 1% TOL.	1.2	JRC.	30/9/96
Changed R16 & R48 to 2V7 Zener Diodes	1.2	JRC.	30/9/96
AMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL405	MIDAS AUDIO		
TITLE: STEREO INPUT POD (MIC. AMP.)	DRAWN: JRC	DATE: 30/9/96	SHEET: 1 OF 3
BOARD No. B2869 BOARD Iss. 1	CHECKED:	SHEET Iss: 1.2	DRG No. XL405-1.2.SCH

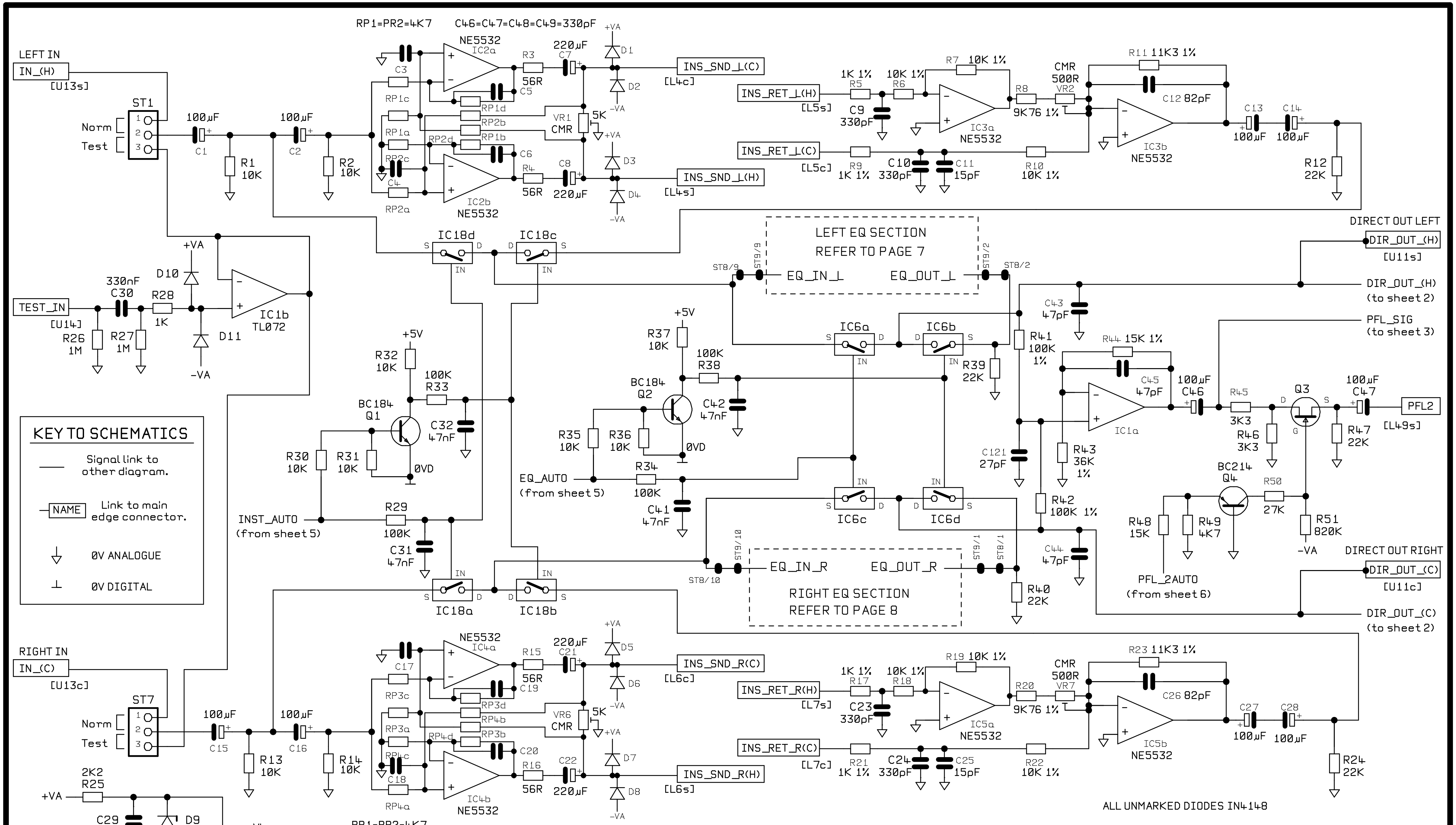


				UNIT: XL405	MIDAS AUDIO		
				TITLE: STEREO INPUT POD (FILTERS)	DRAWN: JRC	DATE: 30/9/96	SHEET: 2 OF 3
Various changes see sheet 1 and 3	1.2	JRC	30/09/96	BOARD No. B2869 BOARD Iss. 1	CHECKED:	SHEET Iss: 1.2	DRG No. XL405-1.2.SCH
AMENDMENTS	ISS.	INIT.	DATE.				



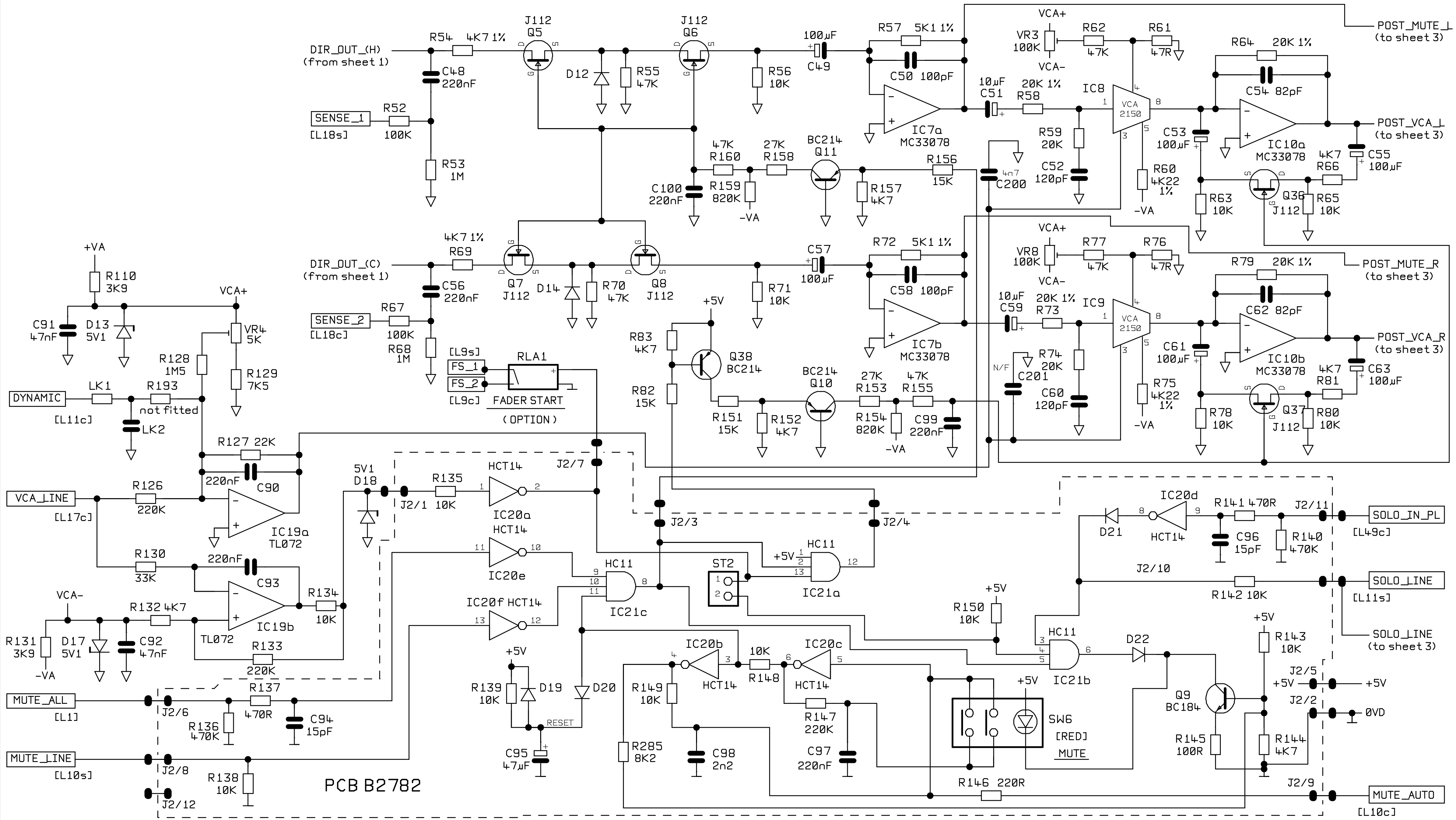
Previous issue amended from 2 to 1.2		AA	18/01/01
ADDED 330pF FITTED ON TEST	1.2	JRC.	30/9/96
ANMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL405	MIDAS AUDIO		
TITLE: STEREO INPUT POD (METERS)	DRAWN: JRC.	DATE: 30/9/96	SHEET: 3 OF 3
BOARD No. B2869 BOARD Iss. 1	CHECKED:	SHEET Iss: 1.2	DRG No. XL405-1.2.SCH

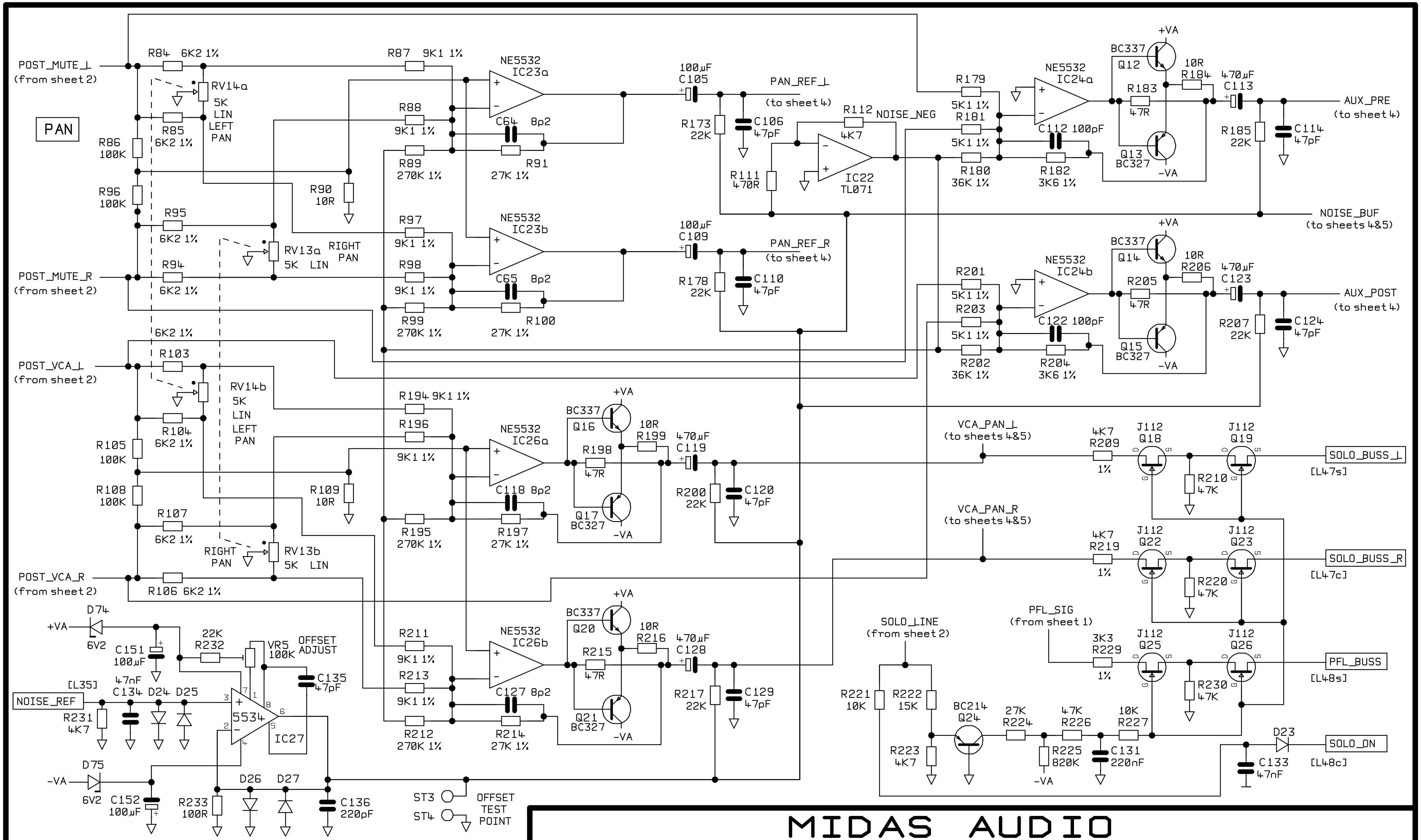


MIDAS AUDIO

Drawn: DGT	Checked: A.C	STEREO INPUT MODULE	INPUT, INSERTS & EQ
BOARD No. B2872 iss 2	DWG No. XL404_1.DGM	ISSUE: 4	DATE: 23.8.96

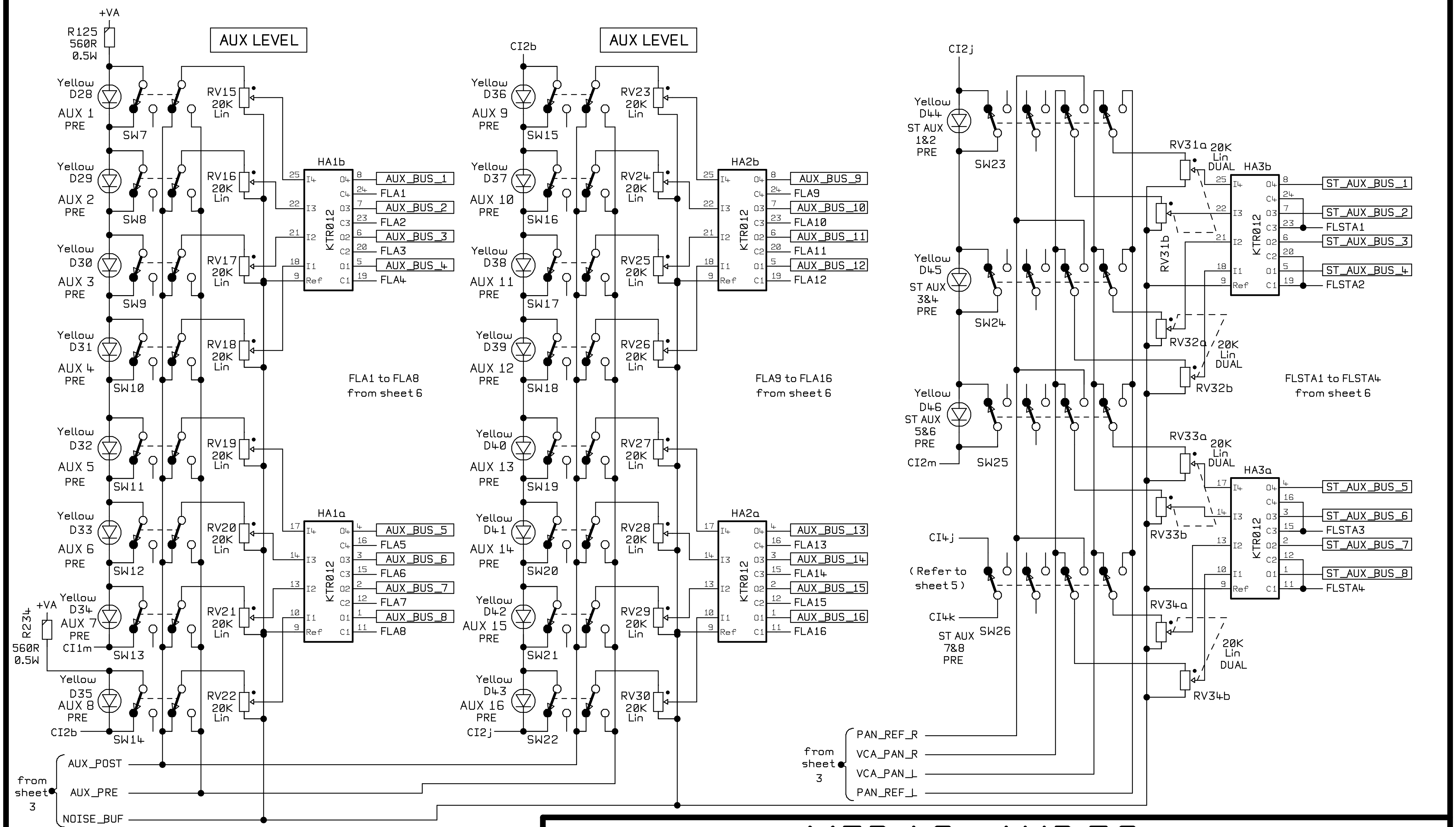


	MIDAS AUDIO
Drawn: DGT	Checked: A.C
STEREO INPUT MODULE	VCA, MUTING & DIRECT OUT
2 OF 9	
PCB No. B2872 I2 & b2782 I3	DWG No. XL404_2.DGM
ISSUE: 4	DATE: 23.8.96



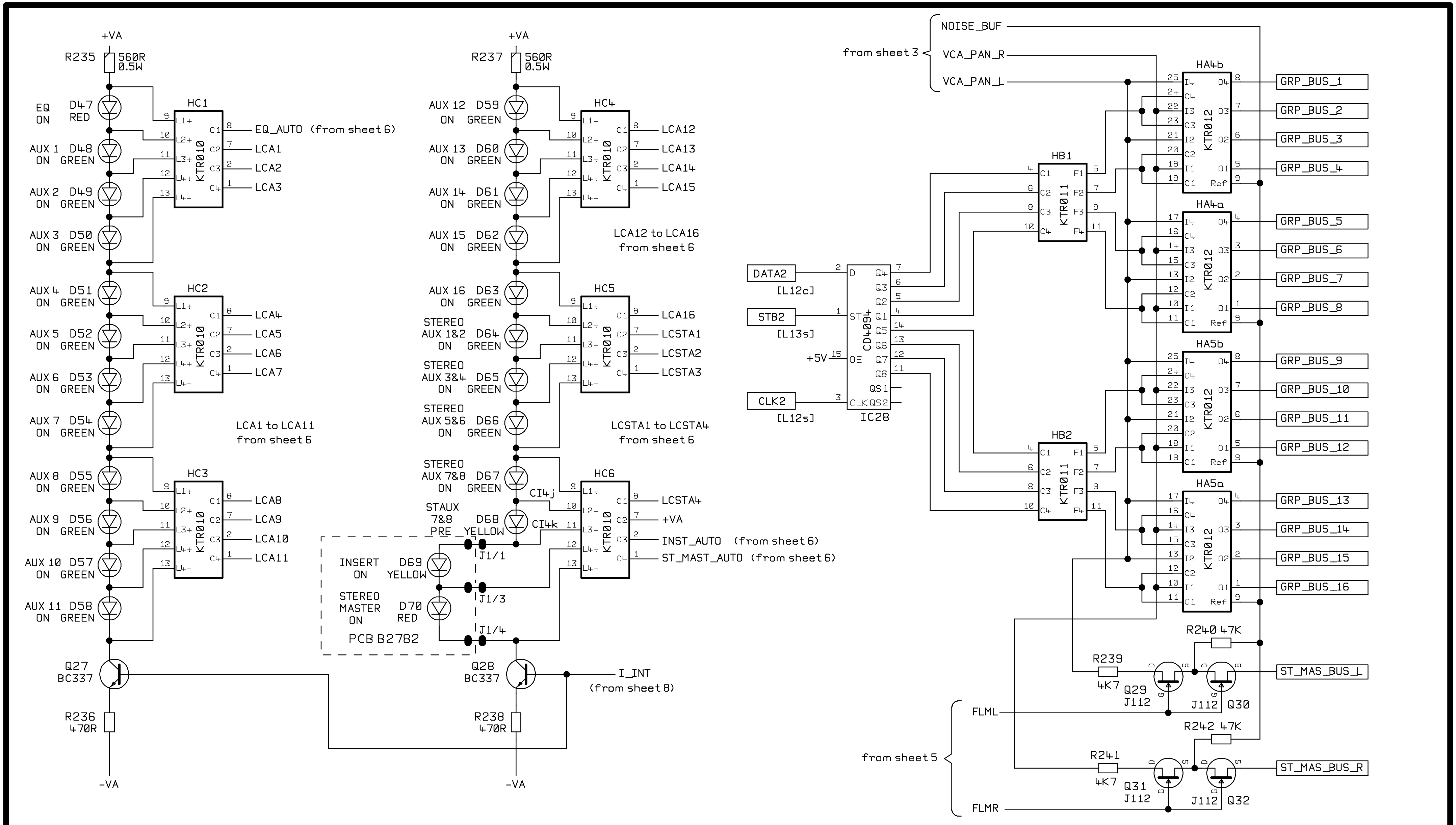
MIDAS AUDIO

Drawn: DGT	Checked: A.C	STEREO INPUT MODULE	PAN, VCA & AUX BUFFERS
BOARD No. B2872 iss 2	DWG No. XL404_3.DGM	ISSUE: 4	DATE: 23.8.96

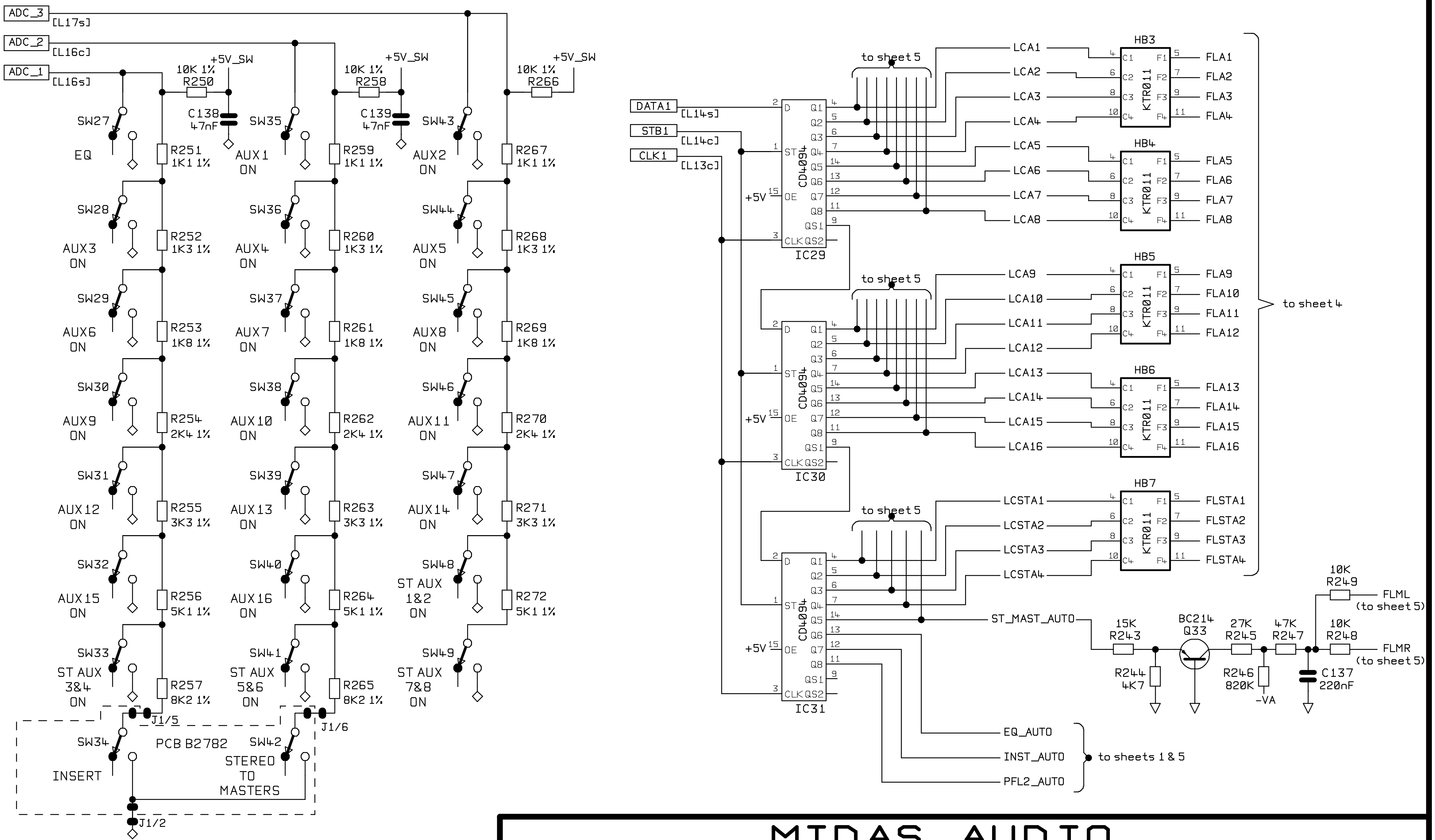


MIDAS AUDIO

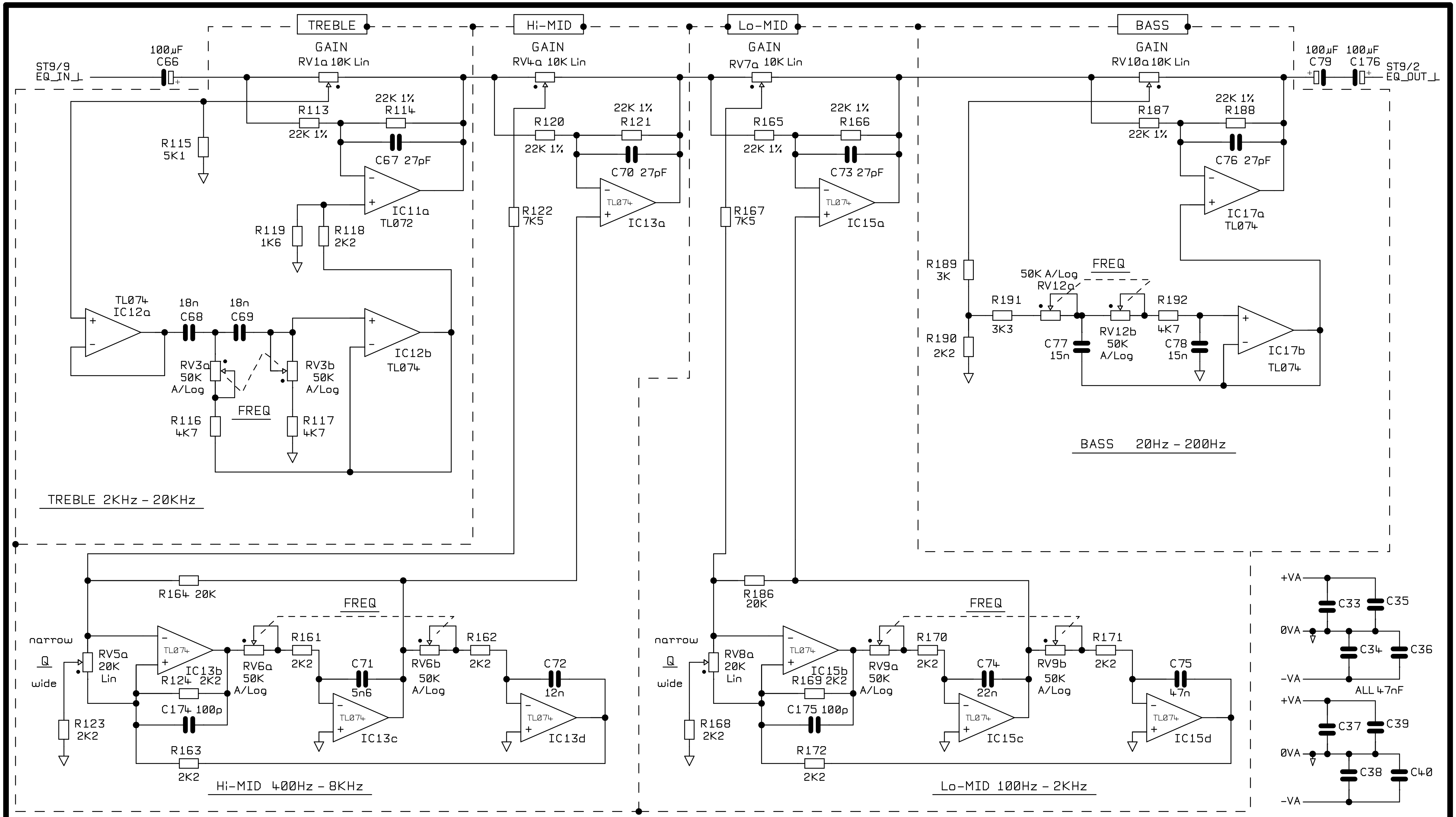
Drawn: DGT	Checked: A.C	STEREO INPUT MODULE	AUX SENDS
BOARD No. B2872 iss 2	DWG No. XL404_4.DGM	ISSUE: 4	DATE: 23.8.96



	MIDAS AUDIO		
Drawn: DGT	Checked: A.C	STEREO INPUT MODULE	LED & FET DRIVERS	5 OF 9
PCB No. B2872 I2 & B2782 I3	DWG No. XL404_5.DGM	ISSUE: 4	DATE: 23.8.96

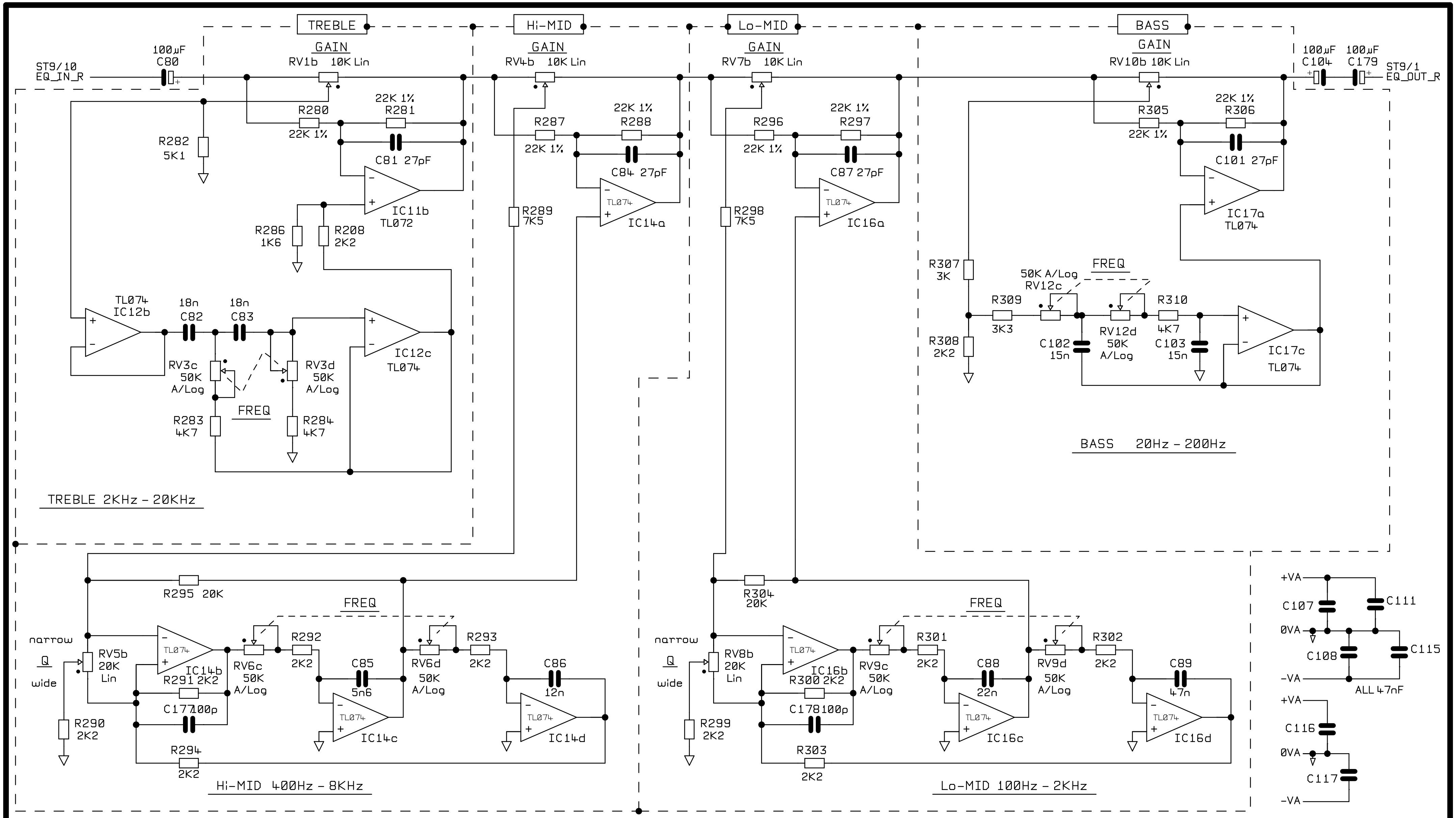


	MIDAS AUDIO		
Drawn: DGT	Checked: A.C	STEREO INPUT MODULE	SWITCH & DATA CODEC
PCB No. B2872 I2 & B2782 I3	DWG No. XL404_6.DGM	ISSUE: 4	DATE: 23.8.96



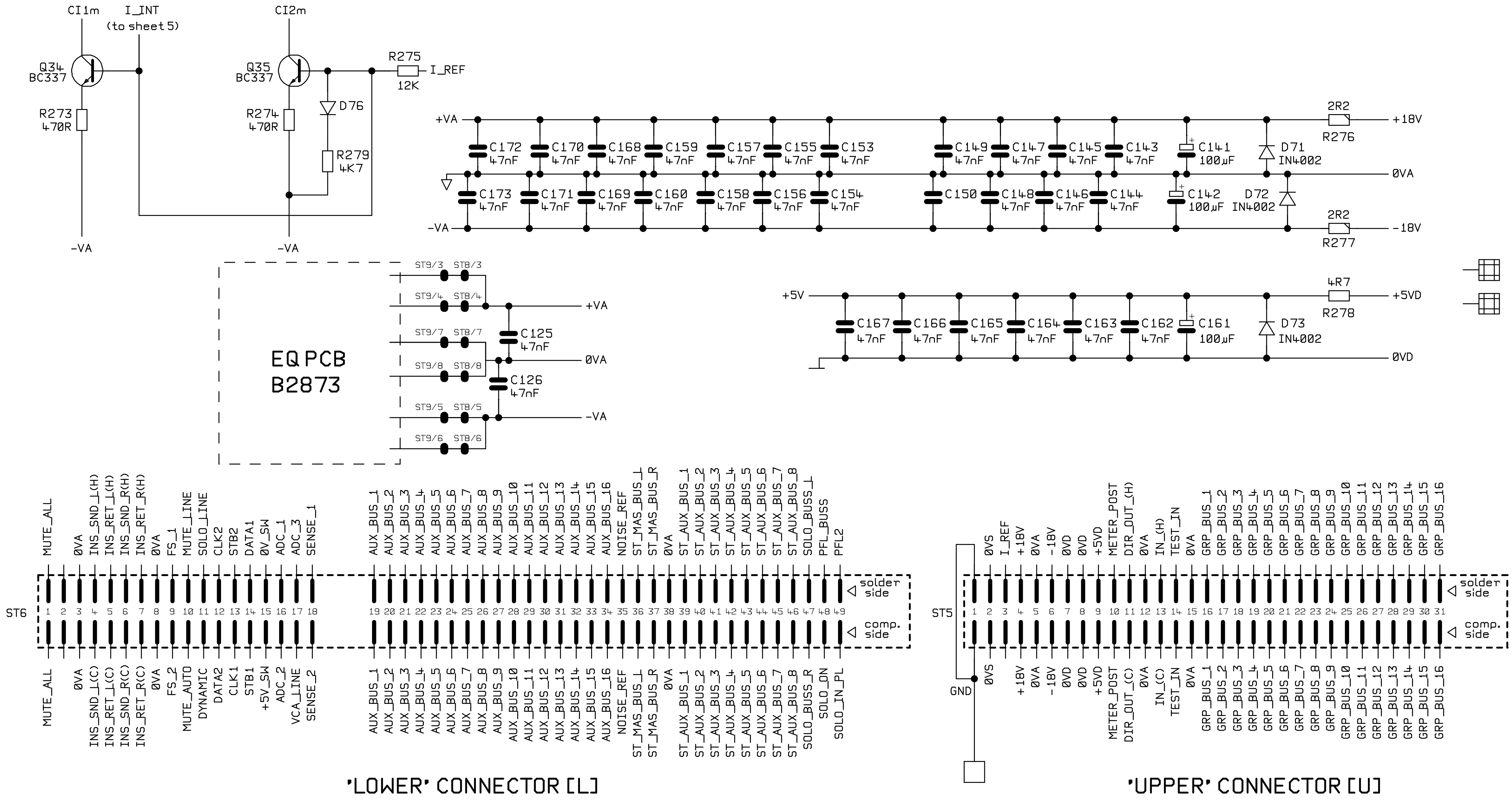
MIDAS AUDIO

Drawn: DGT	Checked: A.C	STEREO INPUT MODULE	LEFT CHANNEL EQUALISER
BOARD No. B2873 iss 1	DWG No. XL404_7.DGM	ISSUE: 4	DATE: 23.8.96

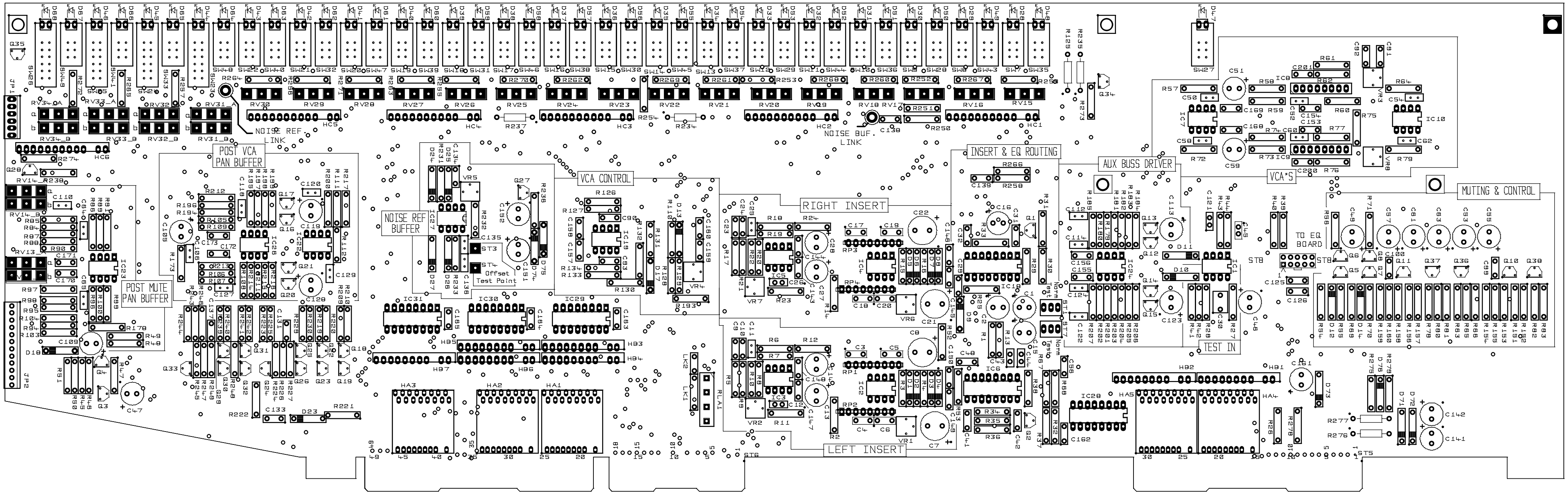


MIDAS AUDIO

Drawn: DGT	Checked: A.C	STEREO INPUT MODULE	RIGHT CHANNEL EQUALISER
BOARD No. B2873 iss 1	DWG No. XL404_8.DGM	ISSUE: 4	DATE: 23.8.96

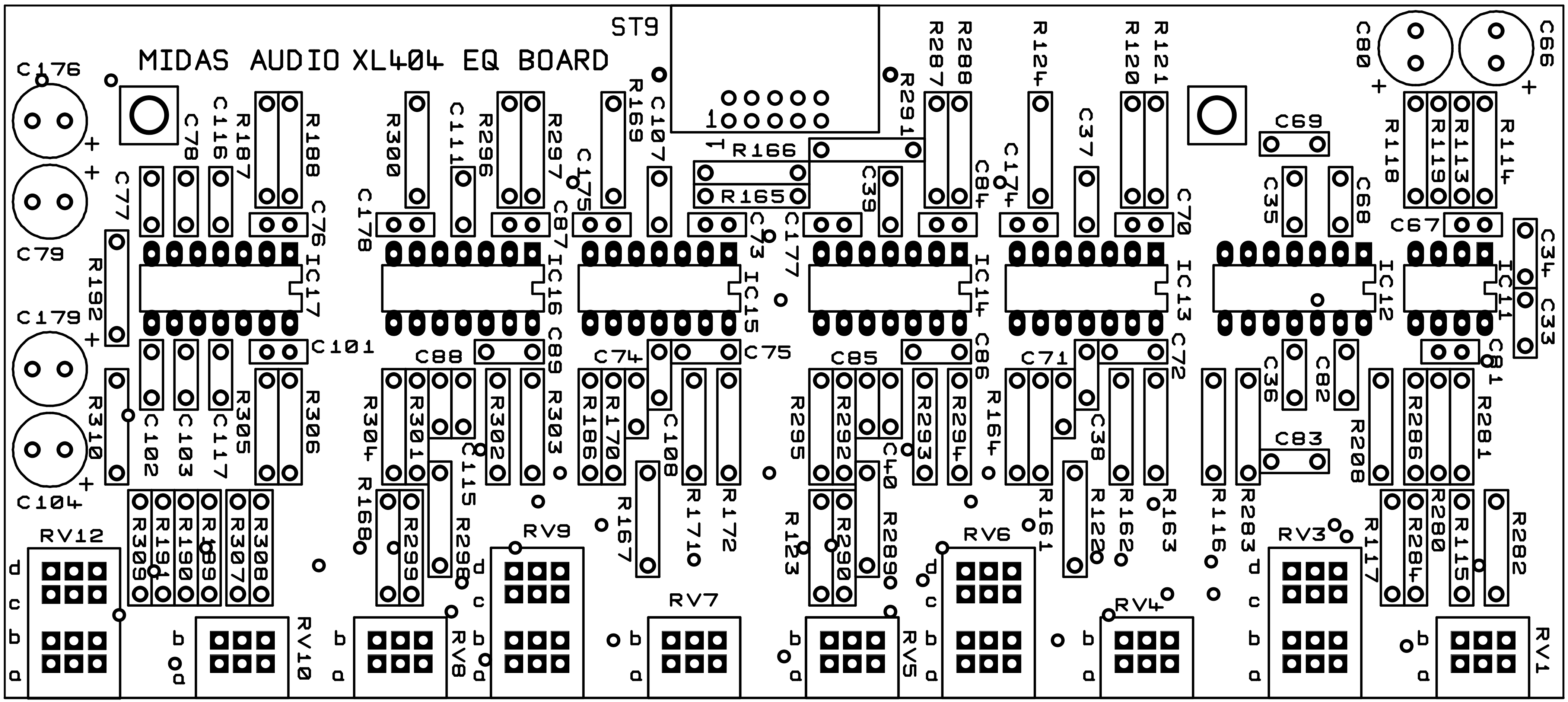


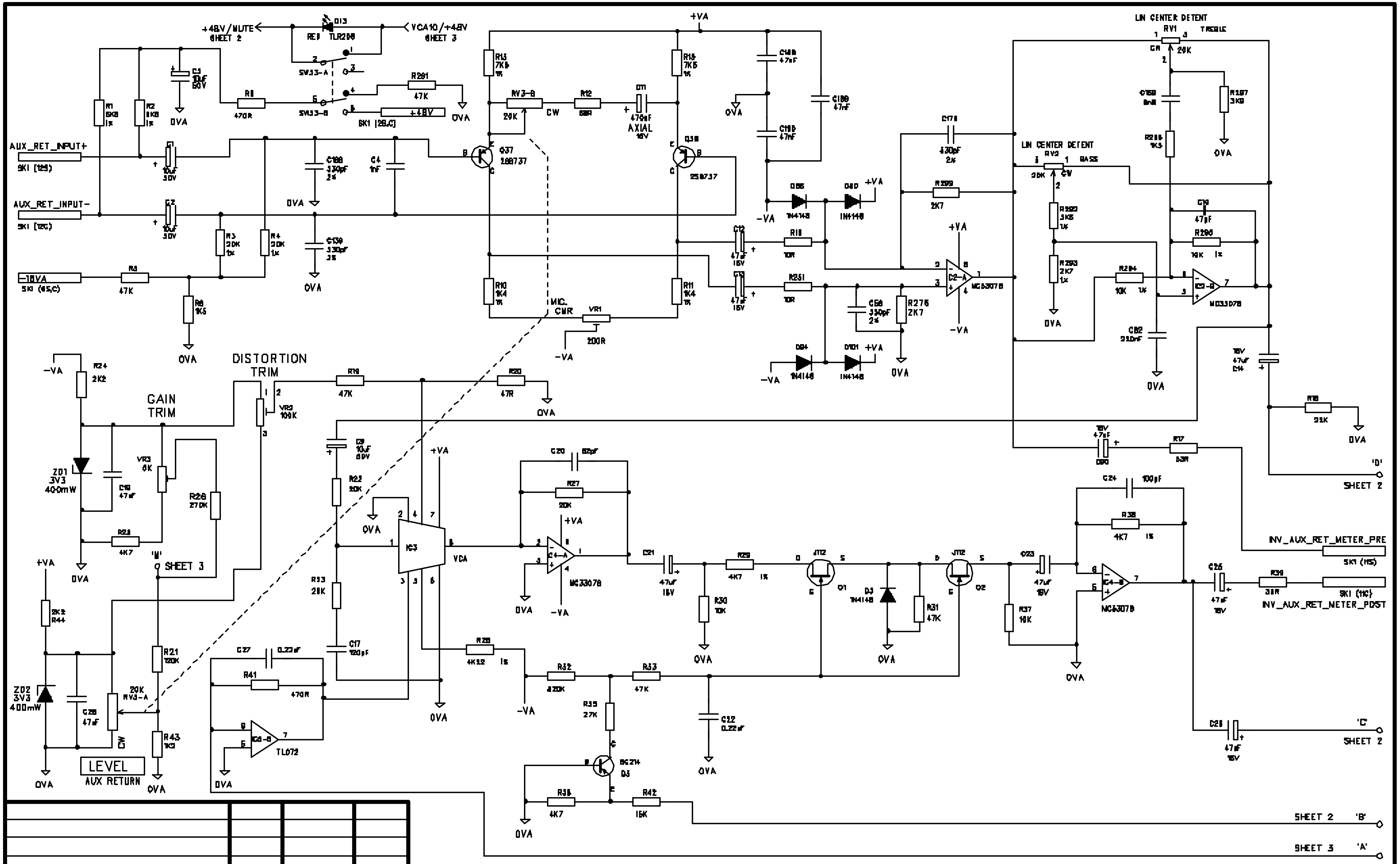
		MIDAS AUDIO		
Drawn: DGT	Checked: A.C	STEREO INPUT MODULE	MAIN CONNECTORS & PSU	9 OF 9
BOARD No. B2872 iss 2		DWG No. XL404_9.DGM	ISSUE: 4	DATE: 23.8.96



SILK SCREEN

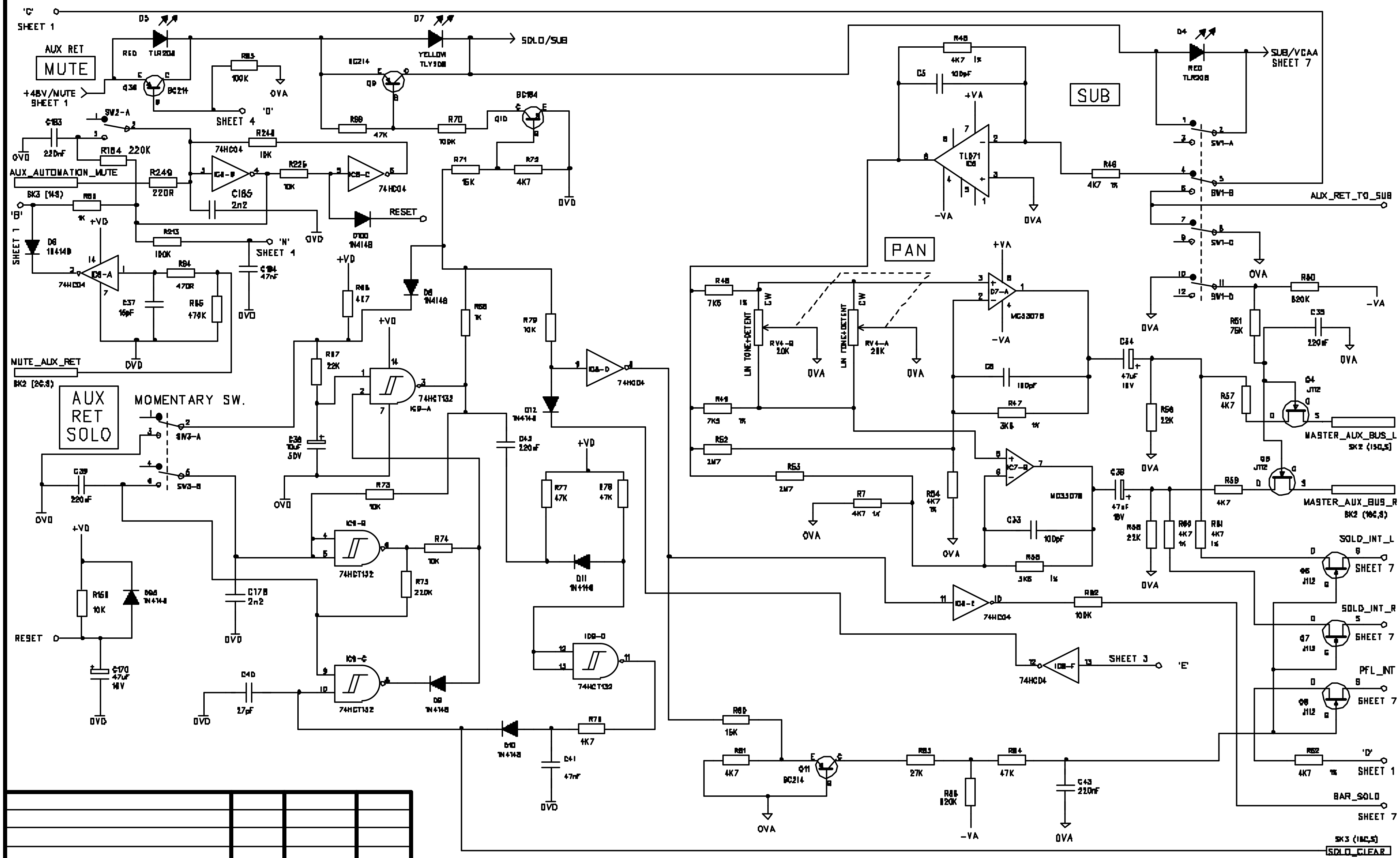
XL4 STEREO MODULE MAIN BOARD


MIDAS AUDIO XL404 EQ BOARD
ST9
C176
C79
C179
C104
C77
C78
C116
R187
R188
R192
C76
IC17
C101
R310
C102
C103
C117
R305
R306
R309
R191
R190
R189
R307
R308
RV12
RV10
R300
C111
R296
R297
C178
C87
IC16
C88
C89
R304
R301
C115
R302
R303
R168
R299
R298
RV8
RV9
C175
R169
C107
IC15
C74
C75
R186
R170
C108
R167
R171
R172
RV7
R166
R165
C73
C177
C39
R291
R287
R288
C84
IC14
C85
C86
R295
R292
C40
R293
R294
R164
R123
R290
R289
RV5
RV6
C174
R124
C37
R120
R121
C70
IC13
C71
C72
C38
R161
R122
R162
R163
RV4
C69
C35
C68
IC12
C36
C82
C83
R116
R283
RV3
C80
C66
R118
R119
R113
R114
C67
C34
IC11
C33
C81
R208
R286
R281
R117
R284
R280
R115
R282
RV1



ANMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL414	MIDAS AUDIO		
TITLE: GROUP MODULE (AUX RETURN)	DRAWN: JRC	DATE: 5-12-95	SHEET: 1 OF 8
BOARD No. B2864 BOARD iss. 3	CHECKED:	SHEET iss. 3	DRG No. XL414.SCH



ADDED C178 2n2 TO IC9.4 AND OVD	3	JRC.	5-12-95
CHANGED C185 FROM 100pF TO 2n2	3	JRC.	5-12-95
CHANGED R249 FROM 100R TO 220R	3	JRC.	5-12-95
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL414

MIDAS AUDIO

TITLE: GROUP MODULE (AUX RETURN)

DRAWN: JRC

DATE: 5-12-95

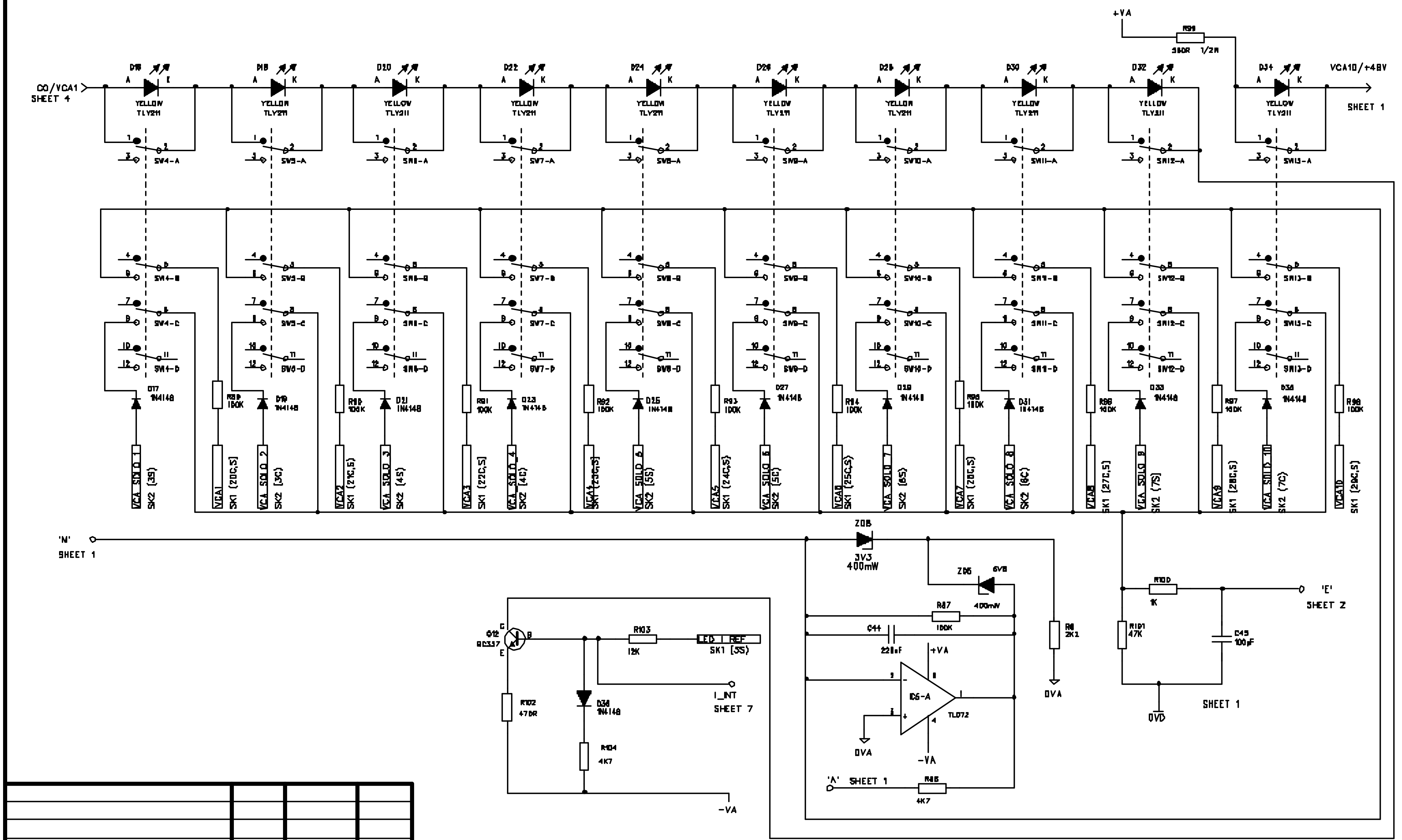
SHEET: 2 OF 8

BOARD No. B2864 BOARD iss. 3

CHECKED:

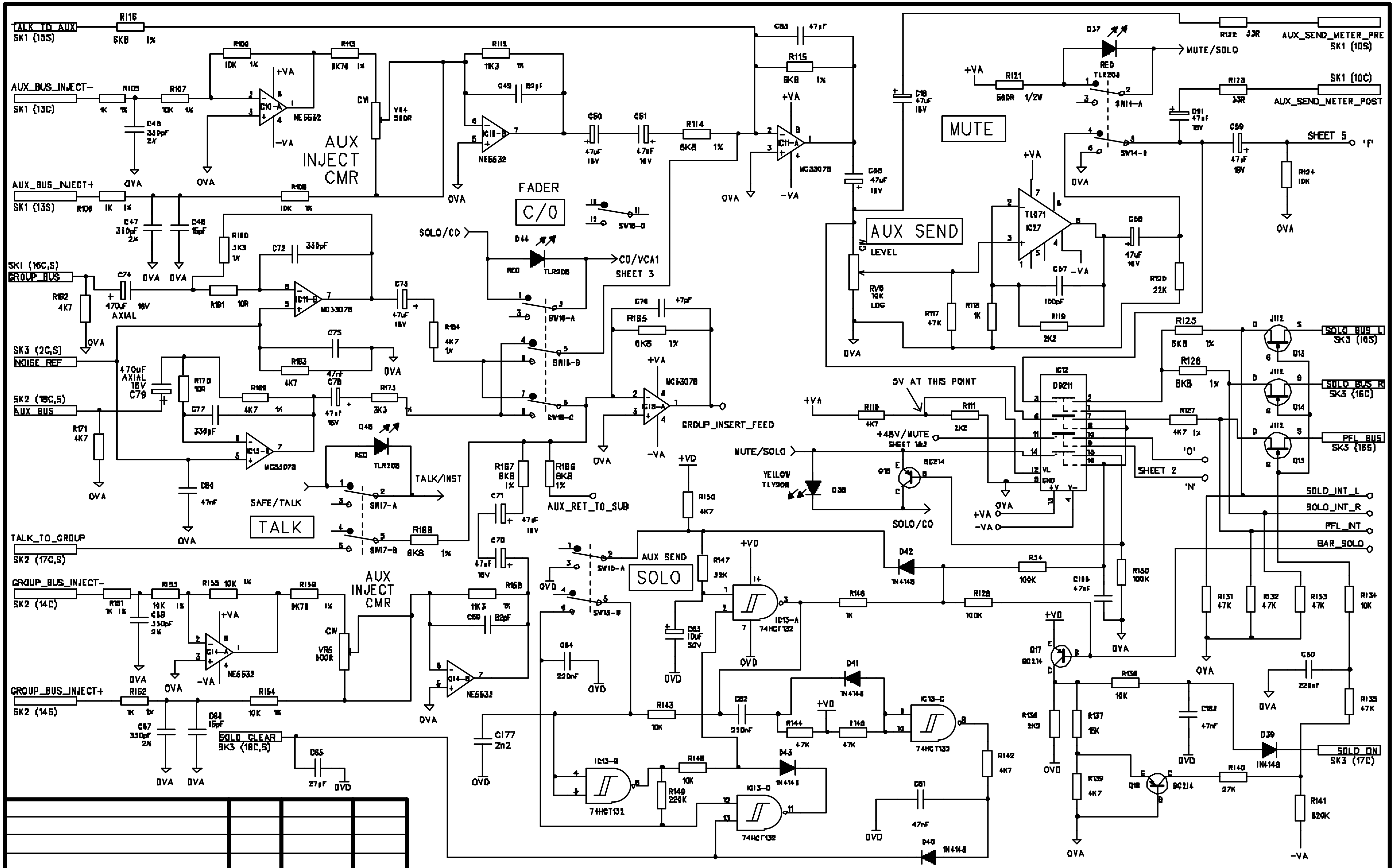
SHEET iss. 3

DRG No. XL414.SCH



ANMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL414	MIDAS AUDIO		
TITLE: GROUP MODULE (AUX RETURN)	DRAWN: JRC.	DATE: 5-12-95	SHEET: 3 OF 8
BOARD No. B2864 BOARD iss. 3	CHECKED:	SHEET iss. 3	DRG No. XL414.SCH



ADDED C177 2n2 TO IC13.4 AND OVD	3	JRC.	6-12-96
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL414

MIDAS AUDIO

TITLE: GROUP MODULE (BUS SUMMING & AUX SEND)

DRAWN: JRC.

DATE: 5-12-95

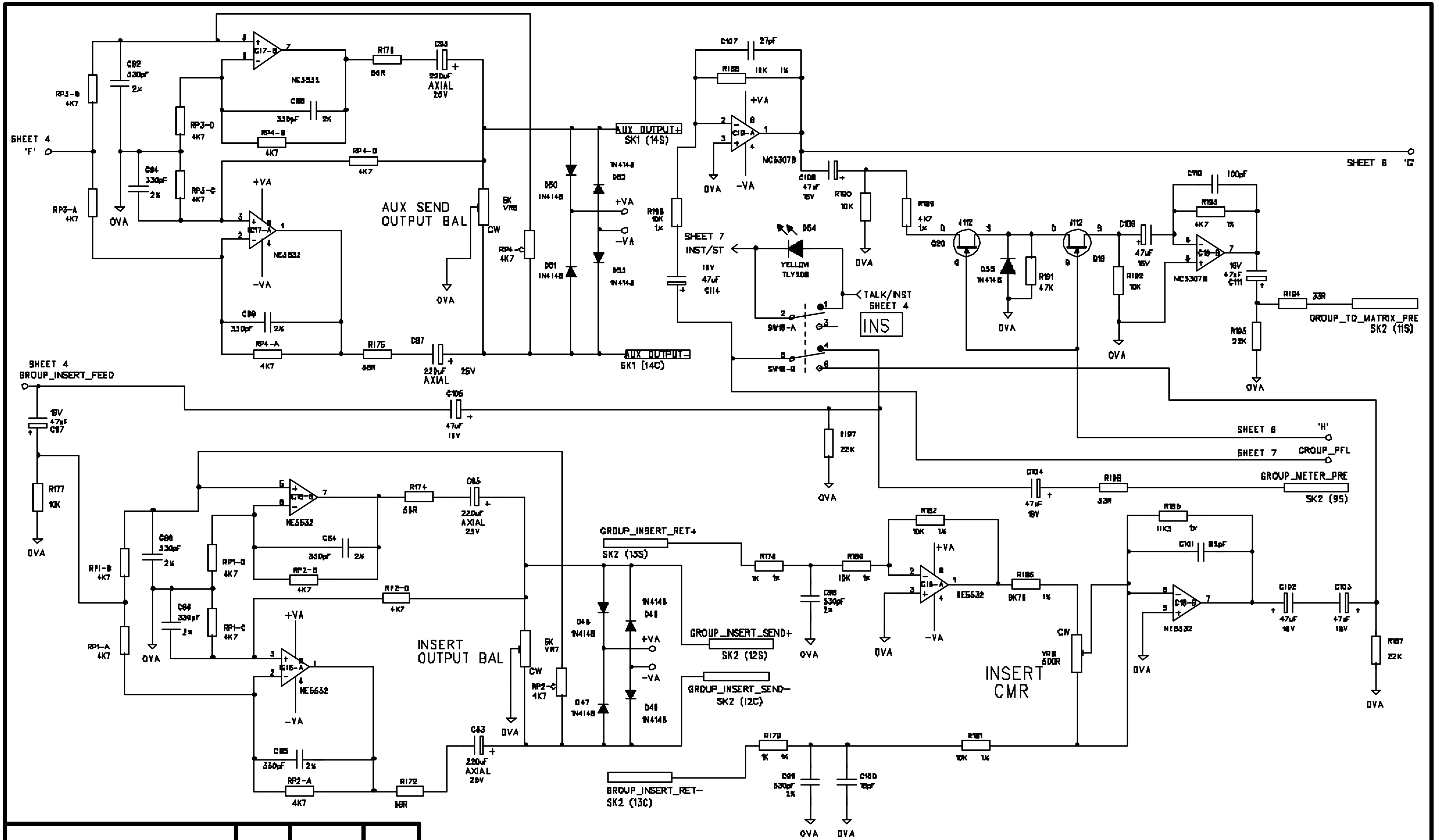
SHEET: 4 OF 8

BOARD No. B2864 BOARD iss. 3

CHECKED:

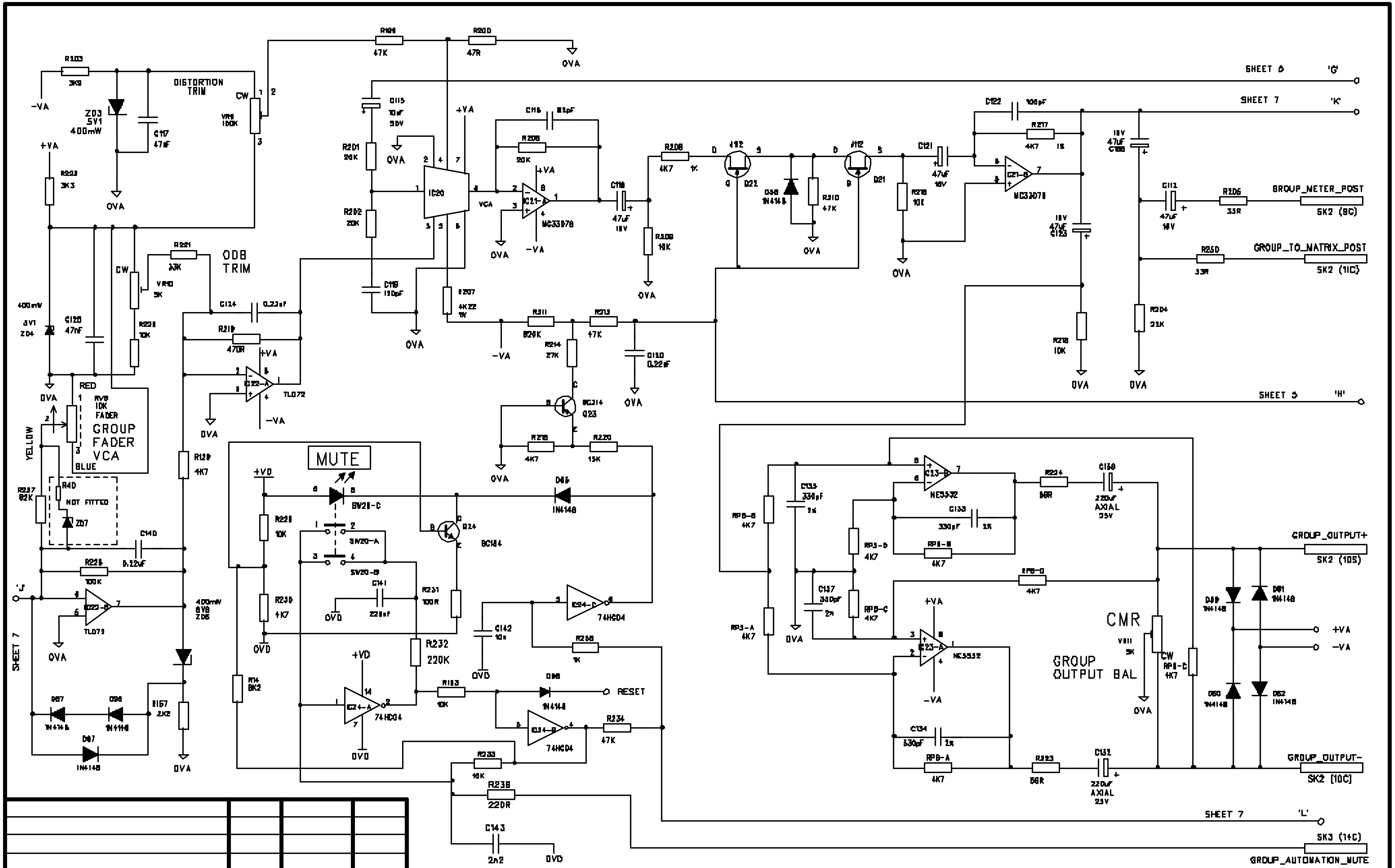
SHEET iss. 3

DRG No. XL414.SCH



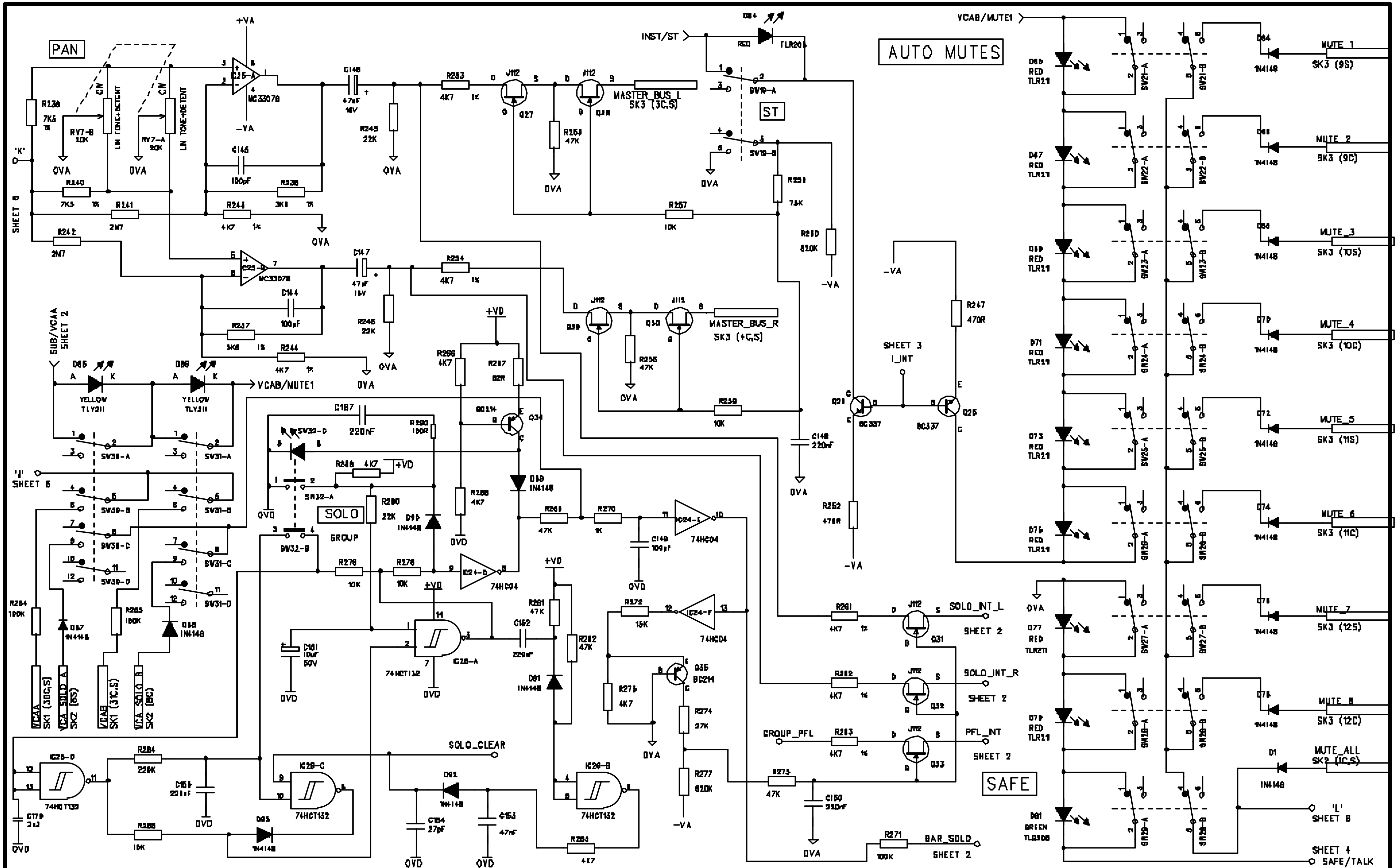
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL414	MIDAS AUDIO		
TITLE: GROUP MODULE (AUX SEND & GROUP)	DRAWN: JRC.	DATE: 5-12-95	SHEET: 5 OF 8
BOARD No. B2864 BOARD iss. 3	CHECKED:	SHEET iss. 3	DRG No. XL414.SCH



CHANGED C143 FROM 100pF TO 2n2	3	JRC.	5-12-95
CHANGED R236 FROM 100R TO 220R	3	JRC.	6-12-96
AMMENDMENTS	ISS.	INIT.	DATE.

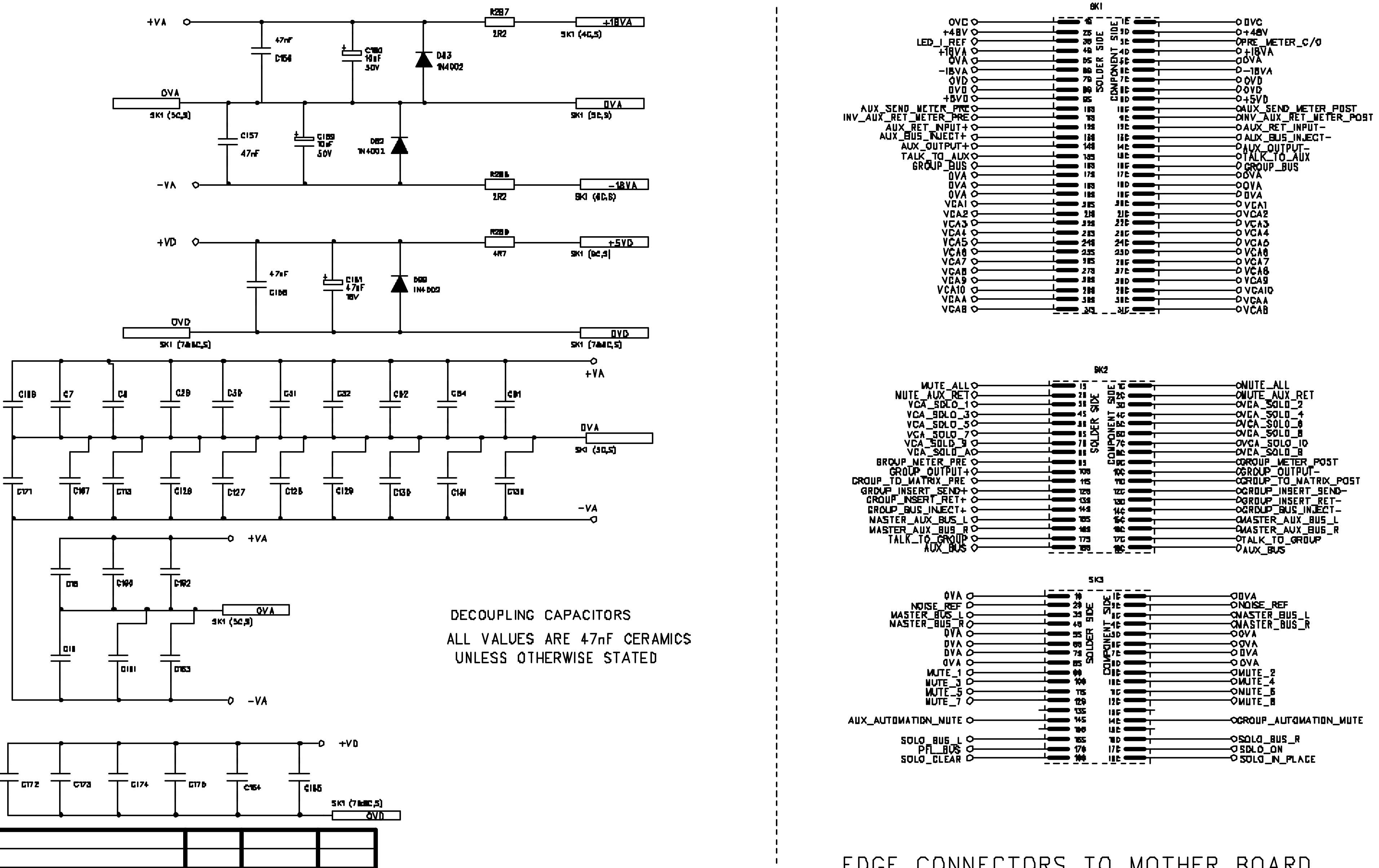
UNIT: XL414	MIDAS AUDIO		
TITLE: GROUP MODULE (GROUP)	DRAWN: JRC.	DATE: 5-12-95	SHEET: 6 OF 8
BOARD No. B2864 BOARD iss. 3	CHECKED:	SHEET iss. 3	DRG No. XL414.SCH



ADDED C179 2n2 TO IC26.12 AND 0VD	3	JRC.	8-12-96
AMENDMENTS	ISS.	INT.	DATE.

MIDAS AUDIO

UNIT: XL414			
TITLE: GROUP MODULE (GROUP)	DRAWN: JRC.	DATE: 5-12-95	SHEET: 7 OF 8
BOARD No. B2864 BOARD iss. 3	CHECKED:	SHEET iss. 3	DRG No. XL414.SCH



AMMENDMENTS	ISS.	INIT.	DATE.

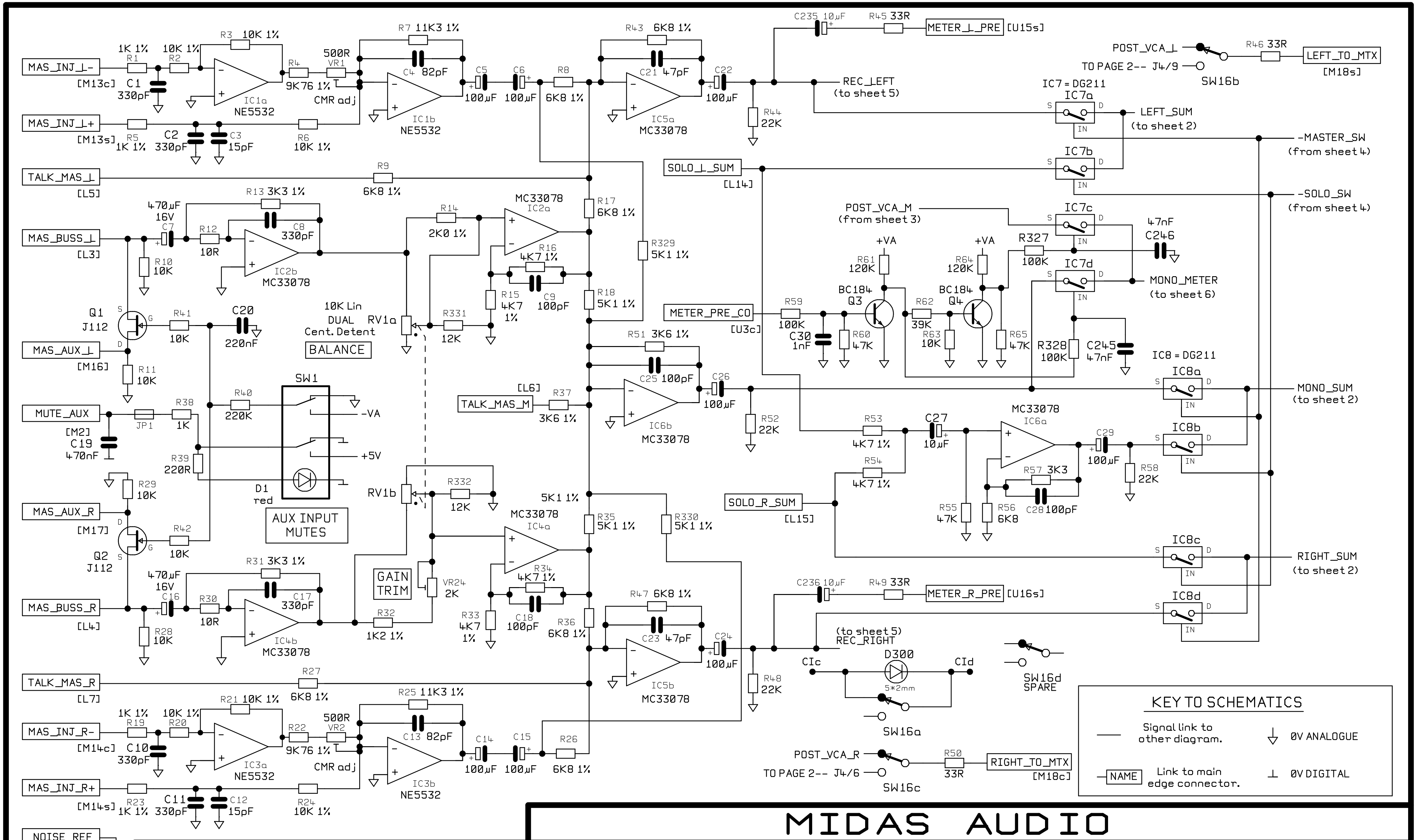
UNIT: XL414

TITLE: GROUP MODULE (EDGE CONNECTORS & DECOUPLING)

BOARD No. B2864 BOARD iss. 3

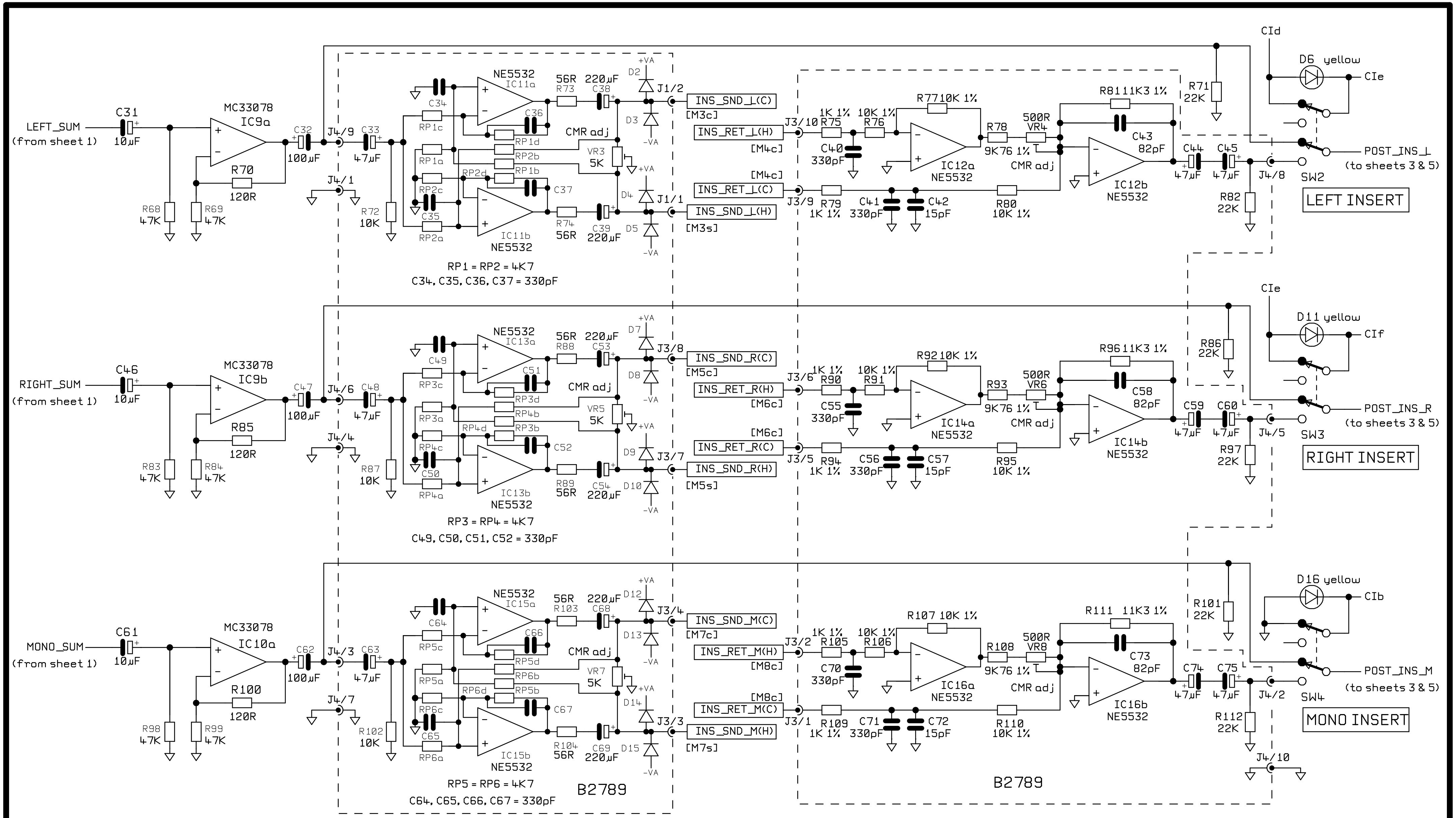
MIDAS AUDIO

DRAWN: JRC.	DATE: 5-12-95	SHEET: 8 OF 8
CHECKED:	SHEET iss. 3	DRG No. XL414.SCH



MIDAS AUDIO

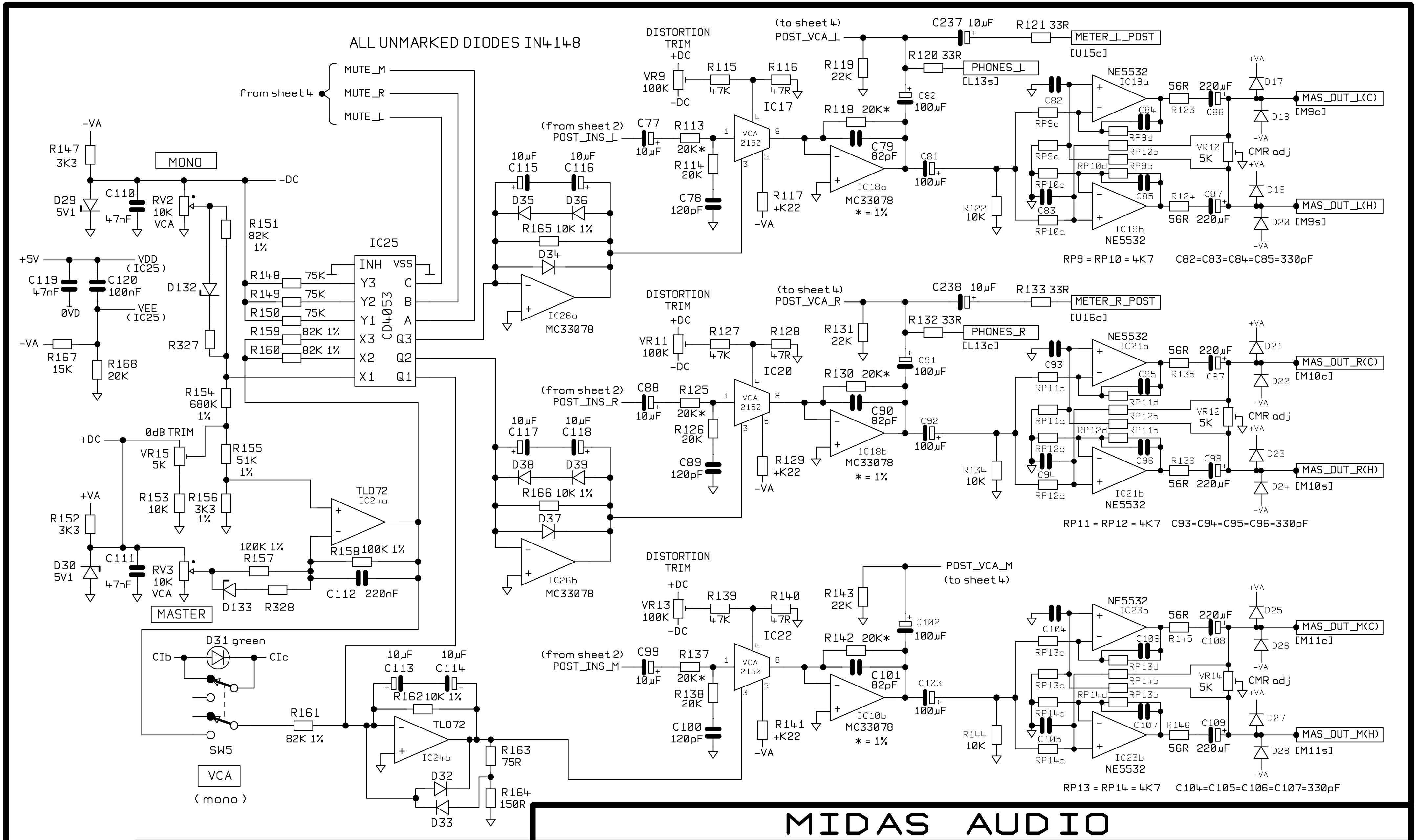
Drawn: DGT	Checked: A.C	XL421 MASTER MODULE	MASTER & TALK INPUTS
BOARD No. B2788 iss 4	DWG No. XL421_1.DGM	DWG. ISSUE: 6	DATE: 22.8.96



ALL UNMARKED DIODES IN4148

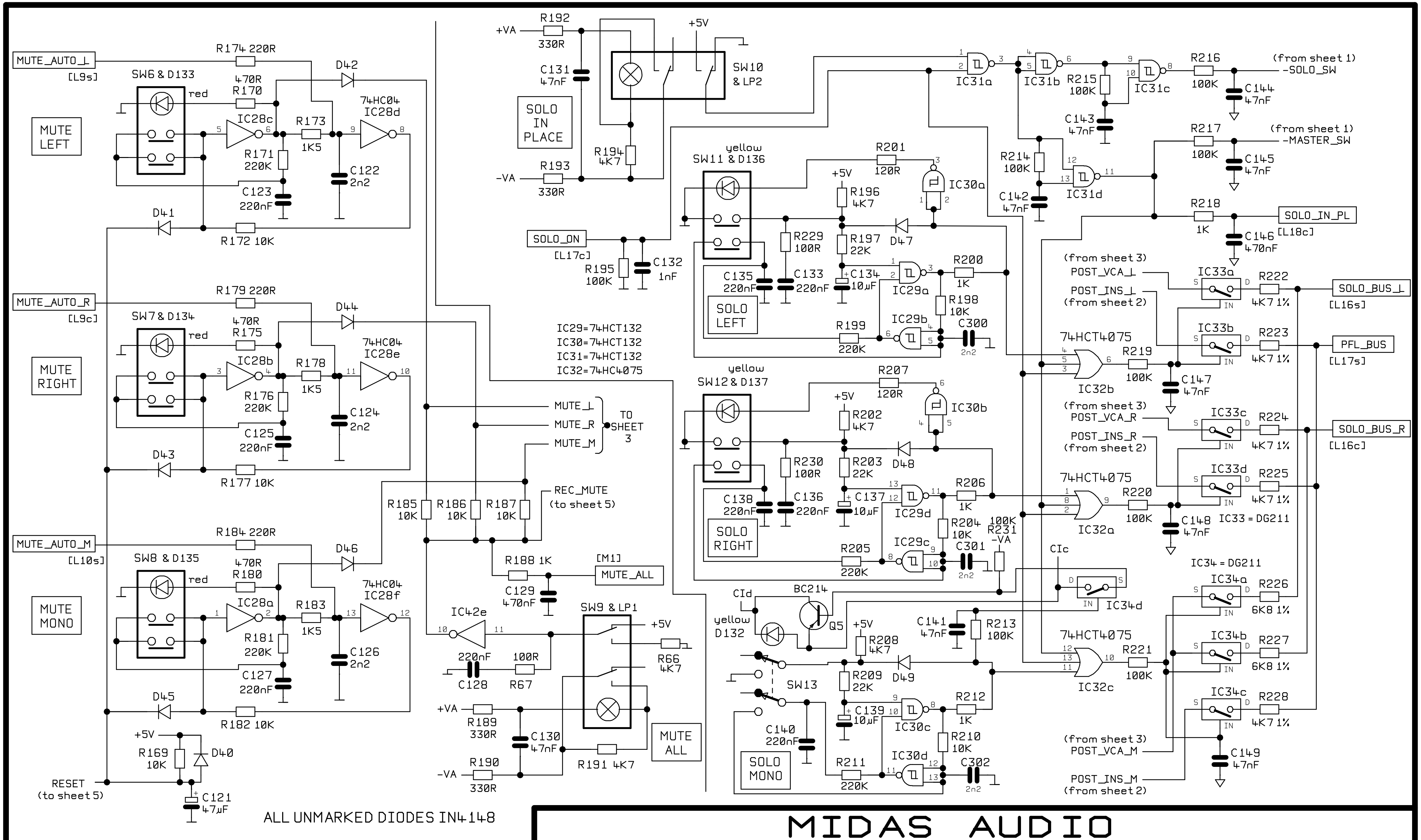
MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL421 MASTER MODULE	INSERTS	2 OF 7
BOARD No. B2788 & B2789	DWG No. XL421_2.DGM	DWG. ISSUE: 6	DATE: 22.8.96



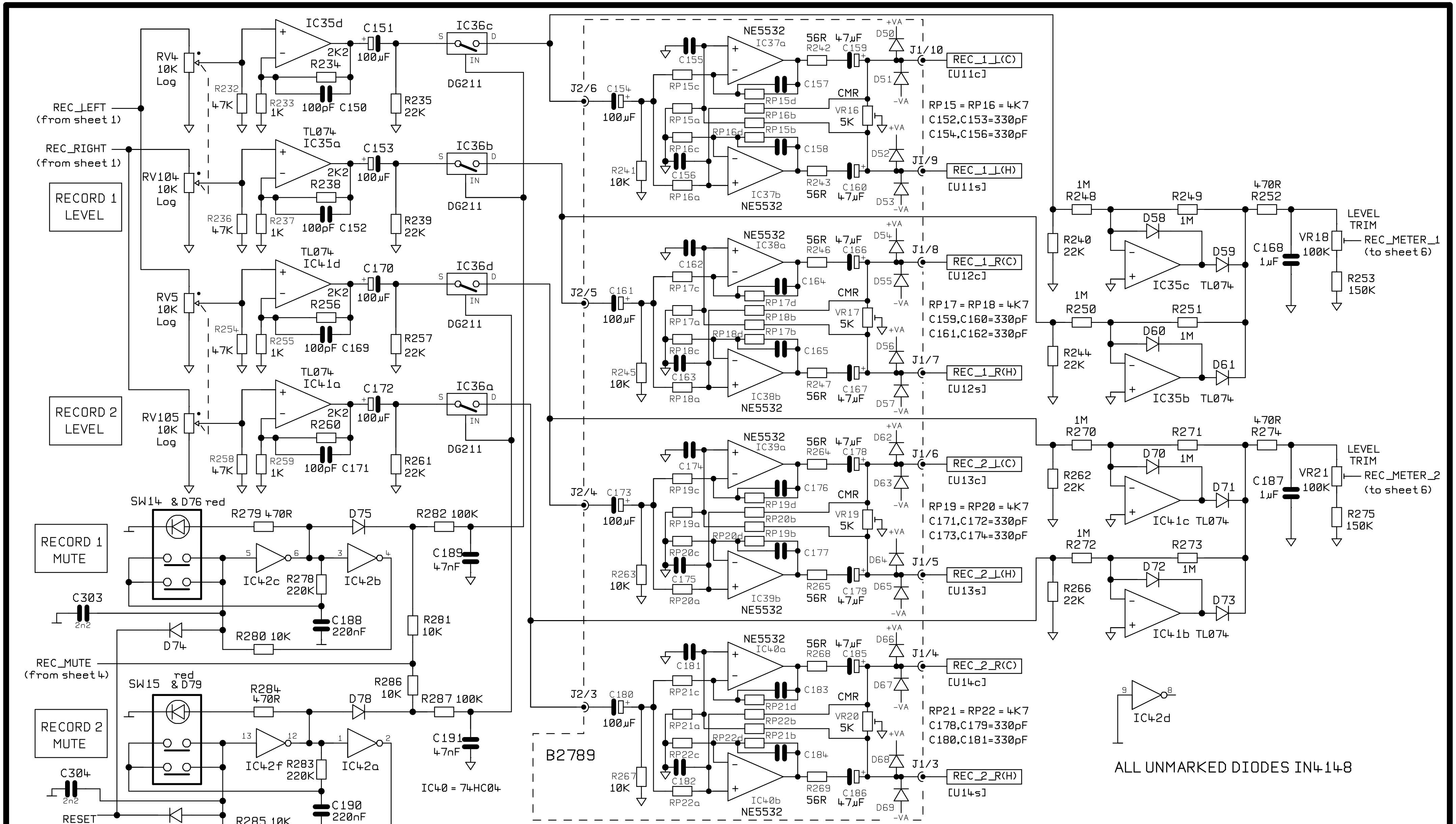
MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL421 MASTER MODULE	INSERTS & VCA CONTROL — 3 OF 7
BOARD No. B2788 iss 4	DWG No. XL421_3.DGM	DWG. ISSUE: 6	DATE: 22.8.96



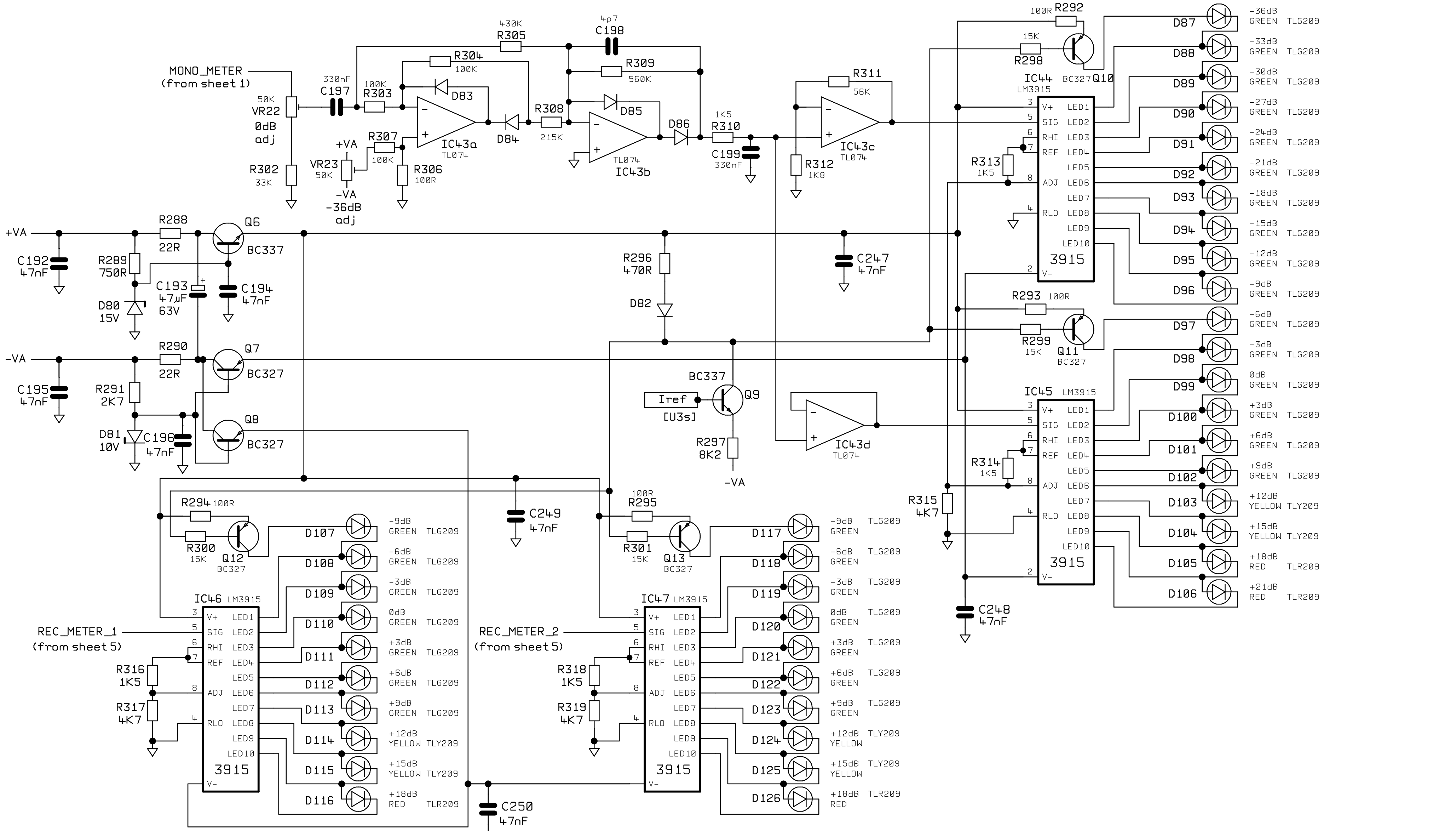
MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL421 MASTER MODULE	MUTES & SOLO SWITCHING	4 OF 7
BOARD No. B2788 iss 4		DWG No. XL421_4.DGM	DWG. ISSUE: 6	DATE: 22.8.96



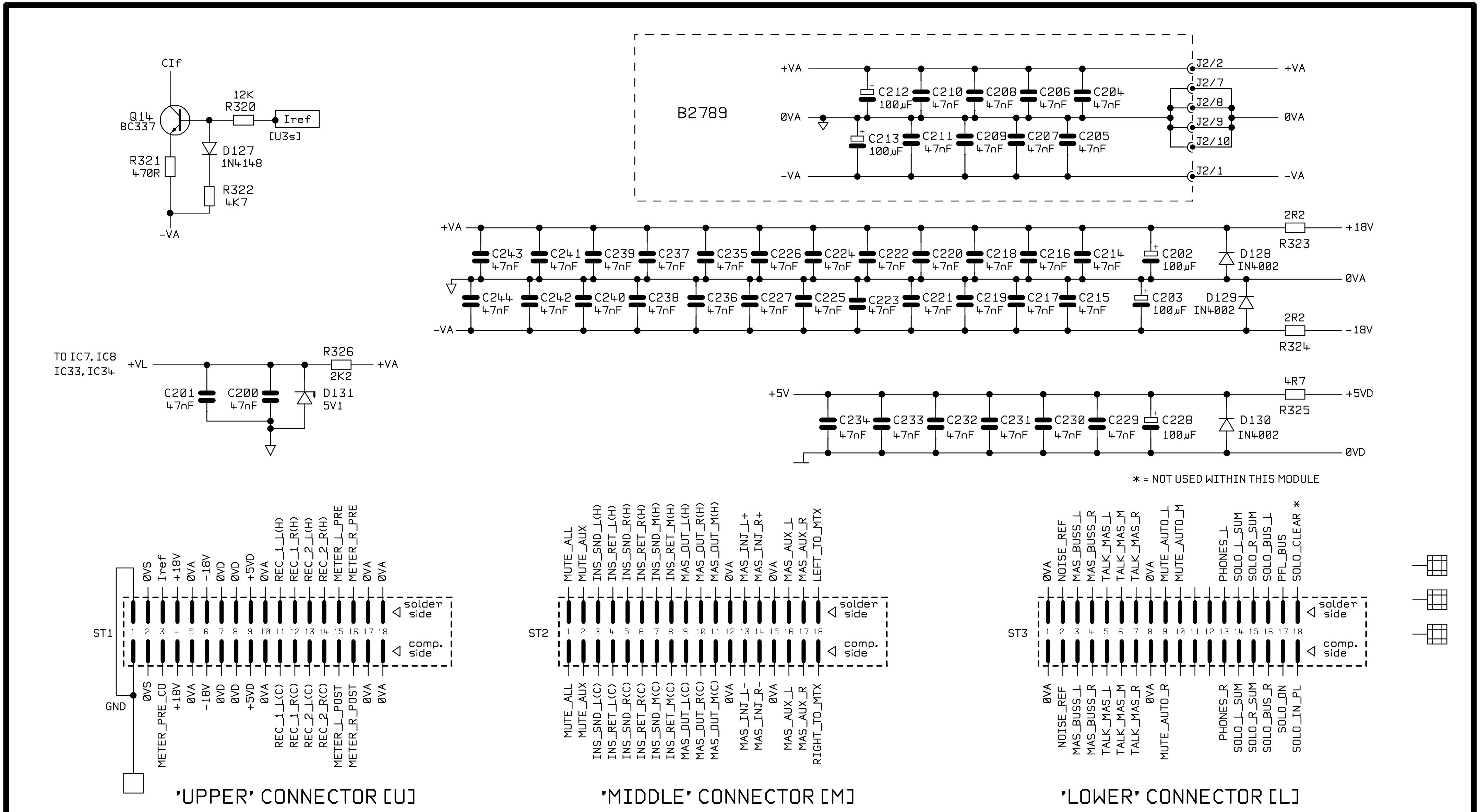
MIDAS AUDIO

Drawn: DGT	Checked: A.C	XL421 MASTER MODULE	RECORD SECTION
BOARD No. B2788 & B2789	DWG No. XL421_5.DGM	DWG. ISSUE: 6	DATE: 22.8.96

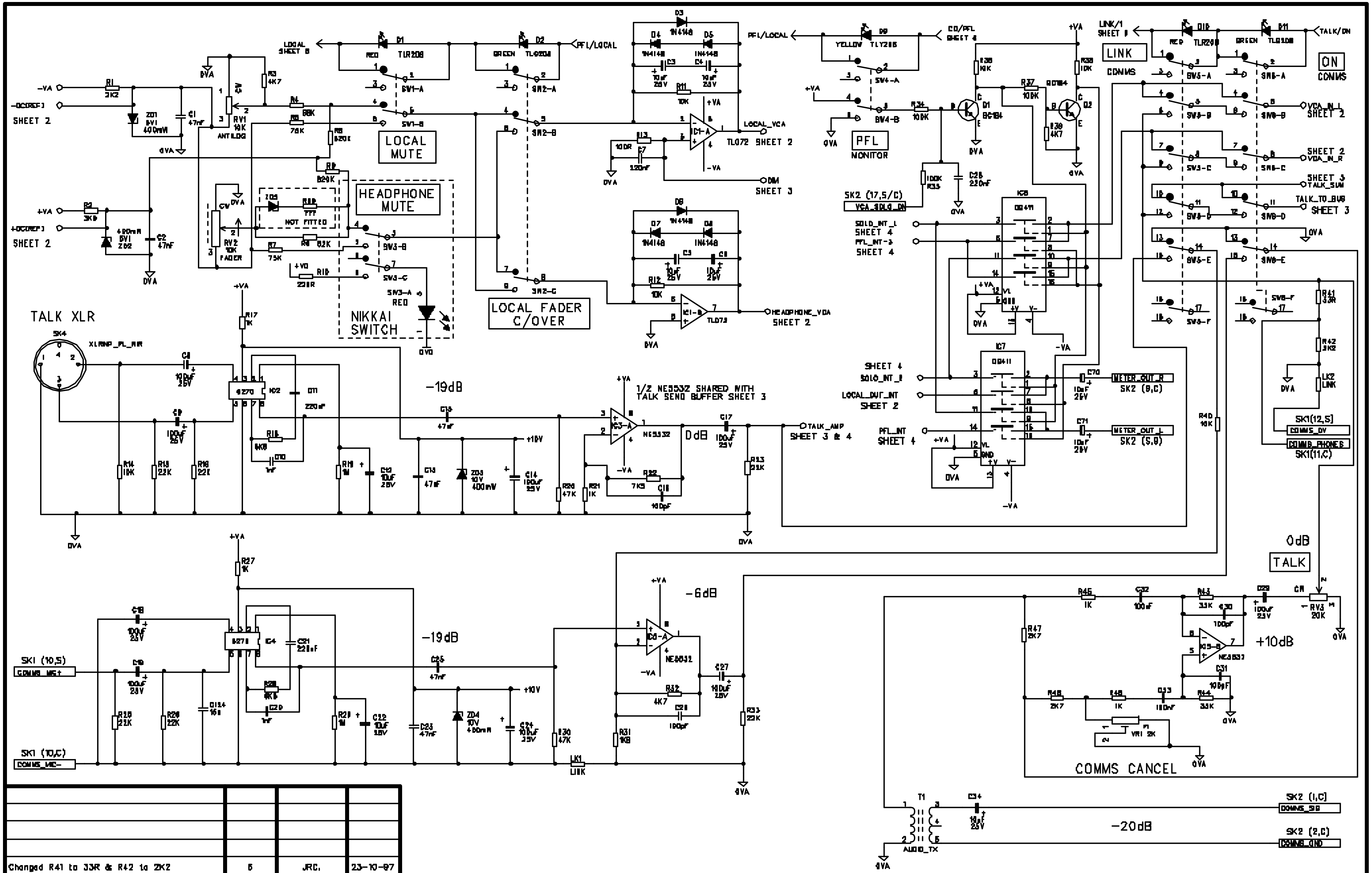


ALL UNMARKED DIODES IN4148

		MIDAS AUDIO		
Drawn: DGT	Checked: A.C	XL421 MASTER MODULE	METERS	6 OF 7
BOARD No. B2788 iss 4		DWG No. XL421_6.DGM	DWG. ISSUE: 6	DATE: 22.8.96

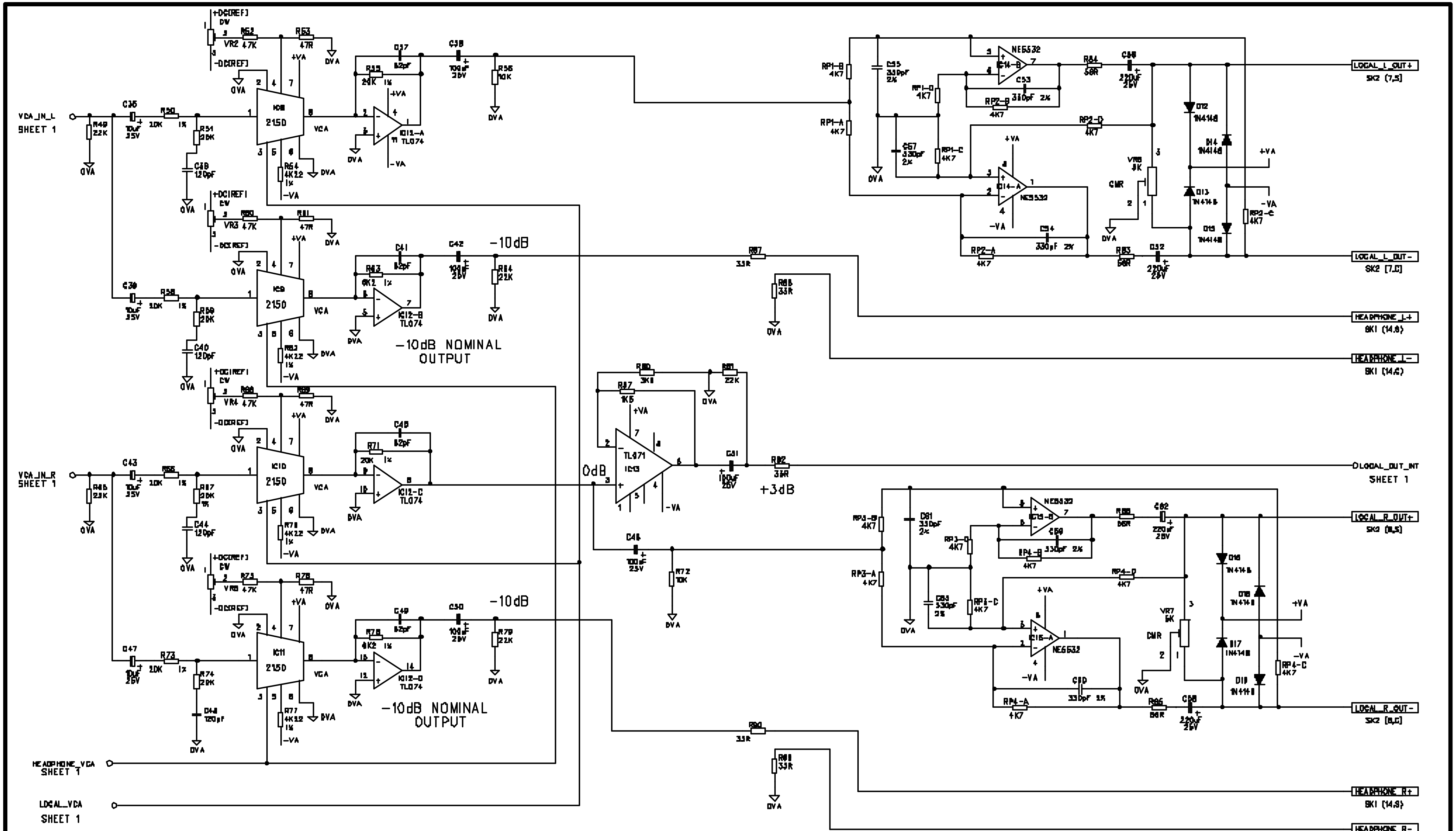


		MIDAS AUDIO		
Drawn: DGT	Checked: A.C	XL421 MASTER MODULE	MAIN CONNECTORS & PSU	7 OF 7
BOARD No. B2788 & B2789		DWG No. XL421_7.DGM	DWG. ISSUE: 6	DATE: 22.8.96



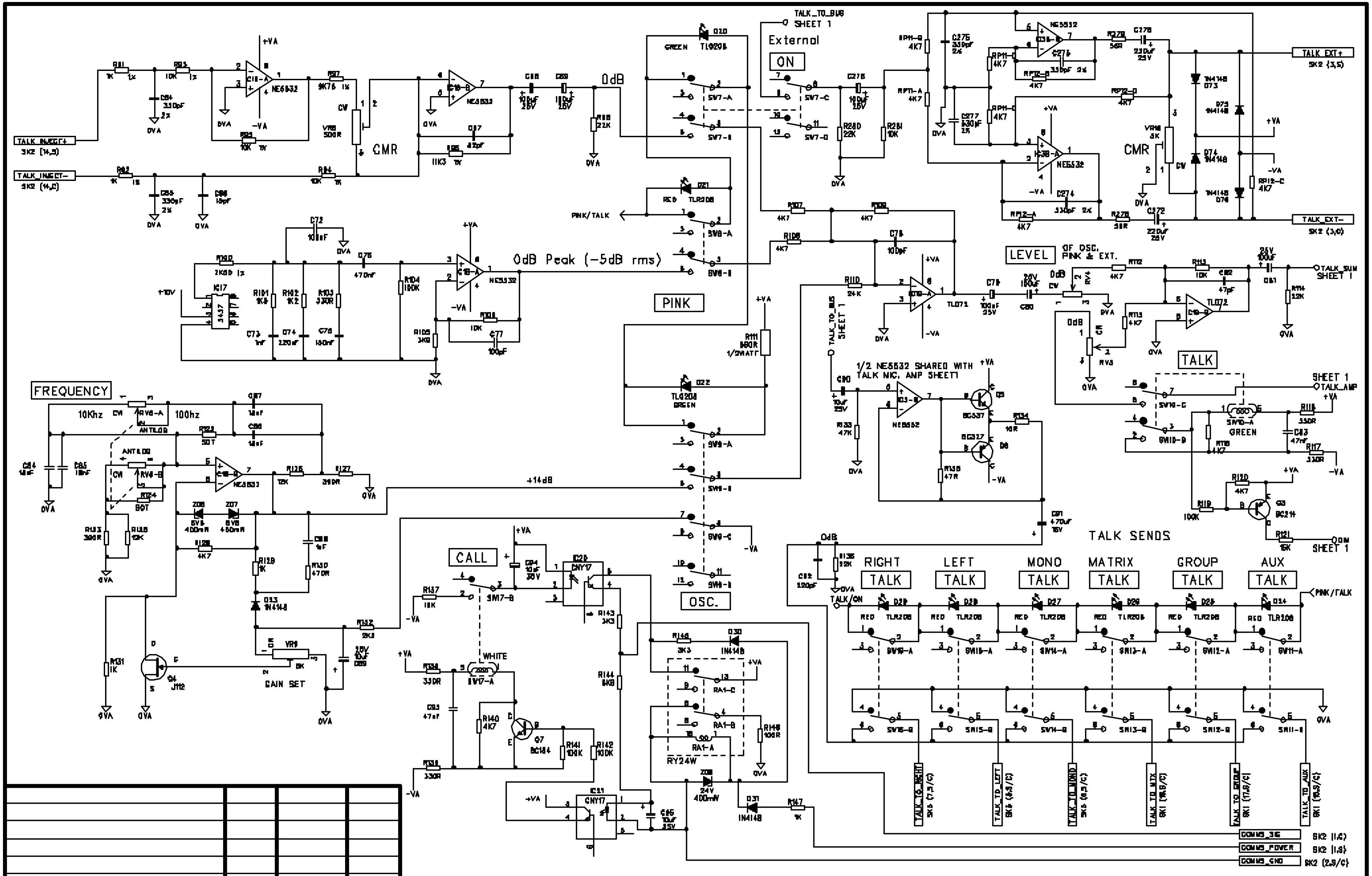
Changed R41 to 33R & R42 to 2K2	5	JRC.	23-10-97
ADDED C124 10nF	3	JRC.	18-9-96
CHANGED BOARD PROFILE	2	JRC.	20-3-95
ADDED ZD5 & R99	2	JRC.	20-3-95
ADDED 2 x 10uF CAPS C70 & C71	1	JRC.	7-11-94
CHANGED SIGNAL PFL_INT_3 TO PFL_INT-3	1	JRC.	7-11-94
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL431	MIDAS AUDIO		
TITLE: COMMS MODULE (VCA CONTROL VOLTAGE AND TALK MIC)	DRAWN: JRC	DATE: 23-10-97	SHEET: 1 OF 6
BOARD No. B2785 BOARD Iss. 4	CHECKED:	SHEET Iss: 6	DRG No. XL431.SCH



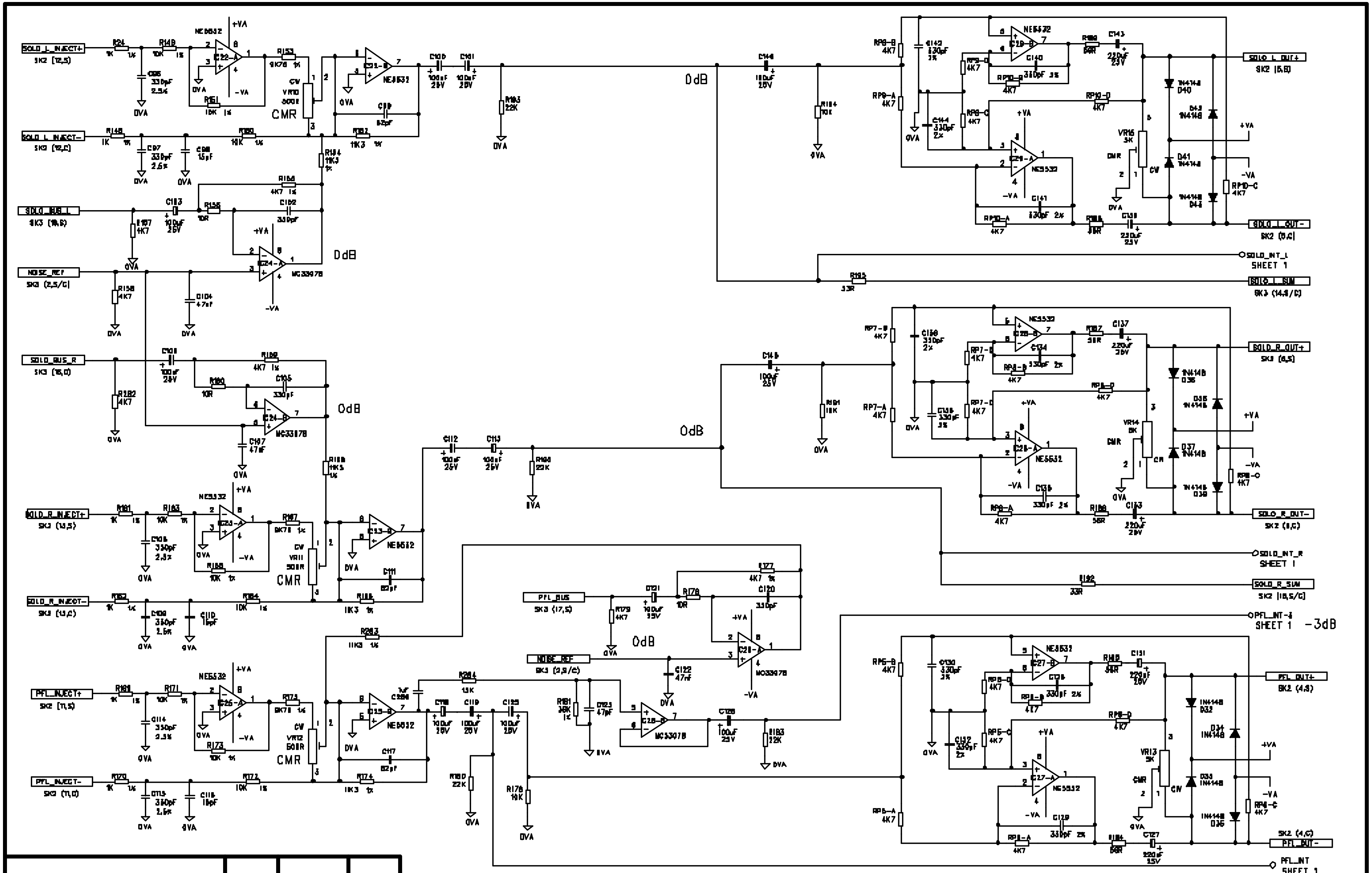
ANMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL431	MIDAS AUDIO		
TITLE: COMMS MODULE (VCA CONTROL VOLTAGE AND TALK MIC.)	DRAWN: JRC	DATE: 23-10-97	SHEET: 2 OF 6
BOARD No. B2785 BOARD Iss. 4	CHECKED:	SHEET Iss: 6	DRG No. XL431.SCH



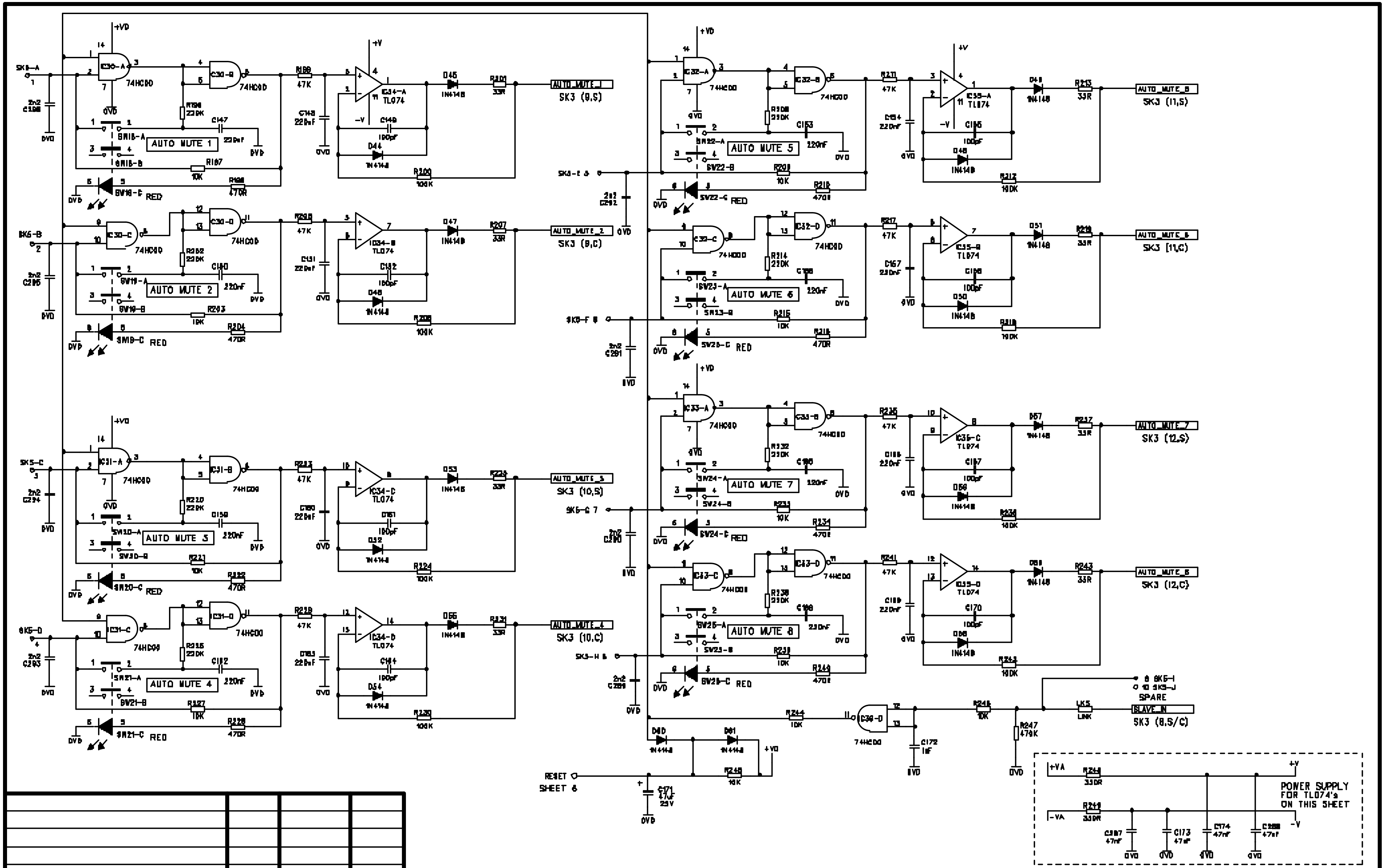
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL431	MIDAS AUDIO		
TITLE: COMMS MODULE (TALK EXT, SEND, CALL, PINK NOISE AND OSC.)	DRAWN: JRC	DATE: 23-10-97	SHEET: 3 OF 6
BOARD No. B2785 BOARD Iss. 4	CHECKED:	SHEET Iss: 6	DRG No. XL431.SCH



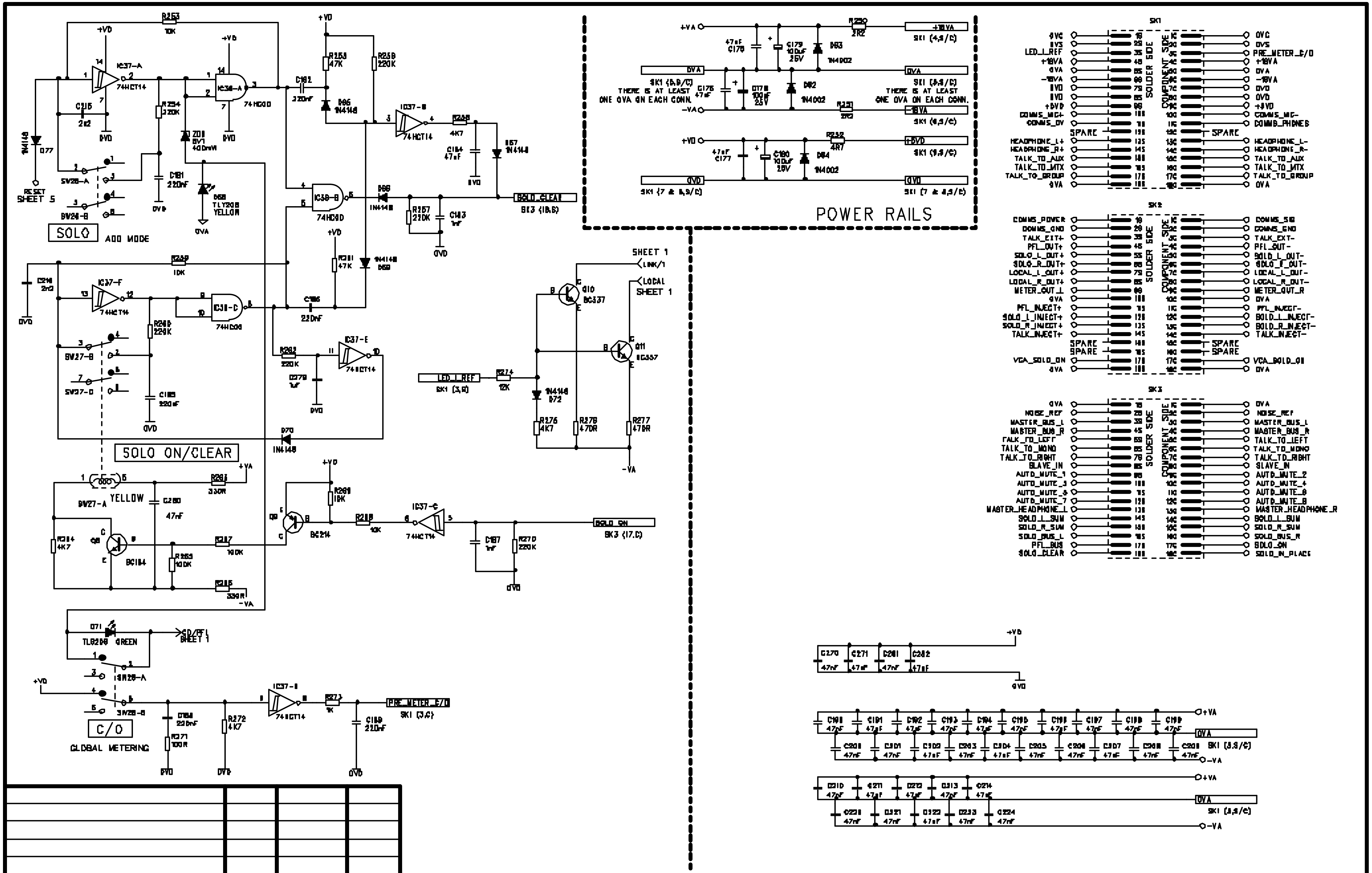
UNIT: XL431		MIDAS AUDIO	
TITLE: COMMS MODULE SOLO I/P'S & O/P'S	DRAWN: JRC	DATE: 23-10-97	SHEET: 4 OF 6
BOARD No. B2785 BOARD Iss. 4	CHECKED:	SHEET Iss: 6	DRG No. XL431.SCH

ANMENDMENTS	ISS.	INIT.	DATE.



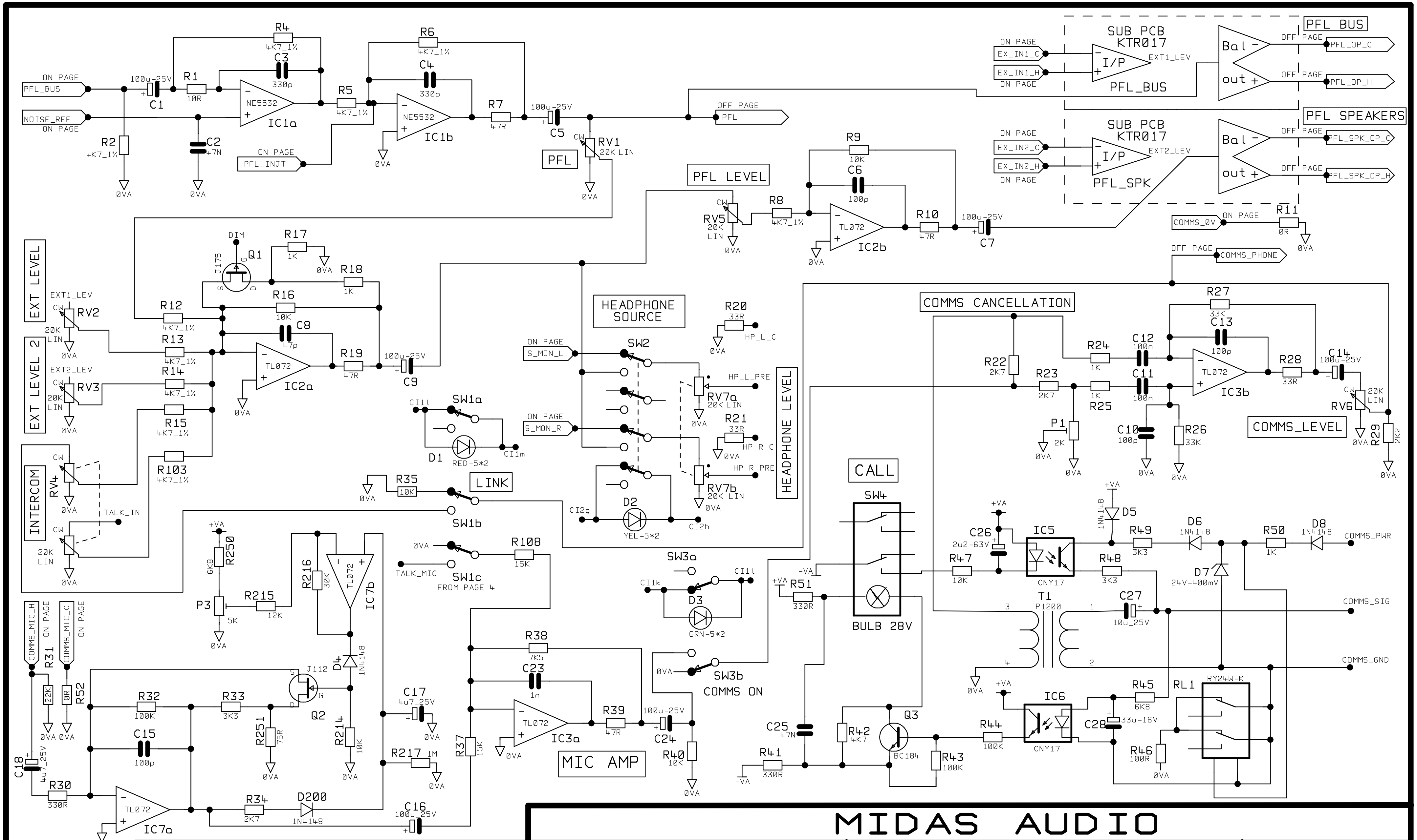
CHANGED C289 - C296 FROM 100pF TO 2n2	4	JRC.	5-12-95
CHANGED R198,R204,R222,R228,R210,R216,	3	JRC.	18-9-96
R234 AND R240 FROM 220R TO 470R	3	JRC.	18-9-95
CHANGED R196,R202,R220,R226,R208,R214.	1	JRC.	7-11-94
R232 AND R238 FROM 47K TO 220K	1	JRC.	7-11-94
ADDED 4 x 100pF CAPS. C289 - C296	1	JRC.	7-11-94
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL431	MIDAS AUDIO		
TITLE: COMMS MODULE (SOLO AND AUTO MUTES)	DRAWN: JRC	DATE: 23-10-97	SHEET: 5 OF 6
BOARD No. B2785 BOARD Iss. 4	CHECKED:	SHEET Iss: 6	DRG No. XL431.SCH

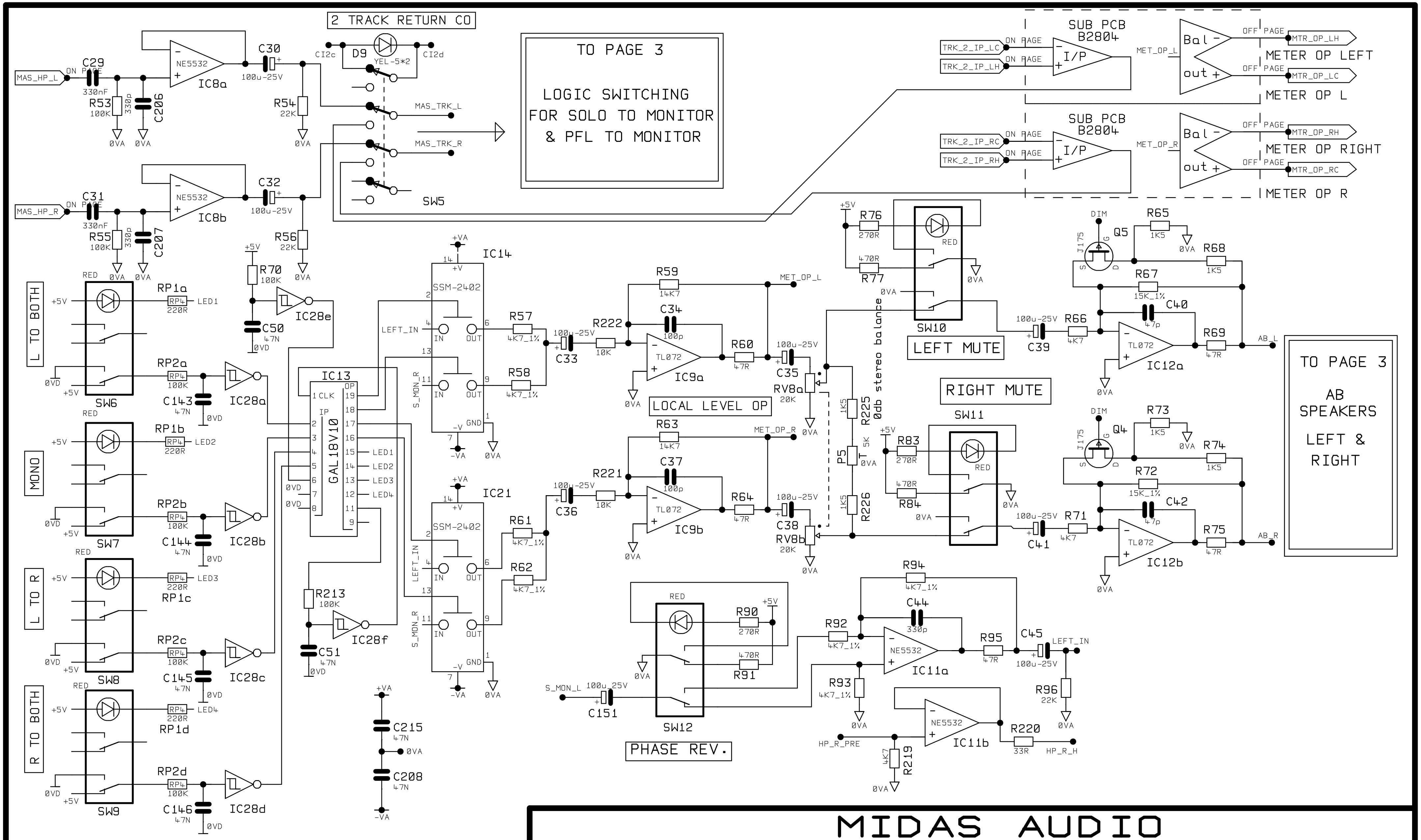


CHANGED R232 FROM 47K TO 220K	5	JRC	27-9-96
ADDED C215 & C216 @ 2n2	4	JRC	5-12-95
ADDED D77	2	JRC	20-3-95
CHANGED R254,R260 & R262 TO 220K	1	JRC	7-11-94
RE-NUMBERED SKI, 2 & 3	1	JRC	1-11-94
AMMENDMENTS	ISS.	INIT.	DATE.

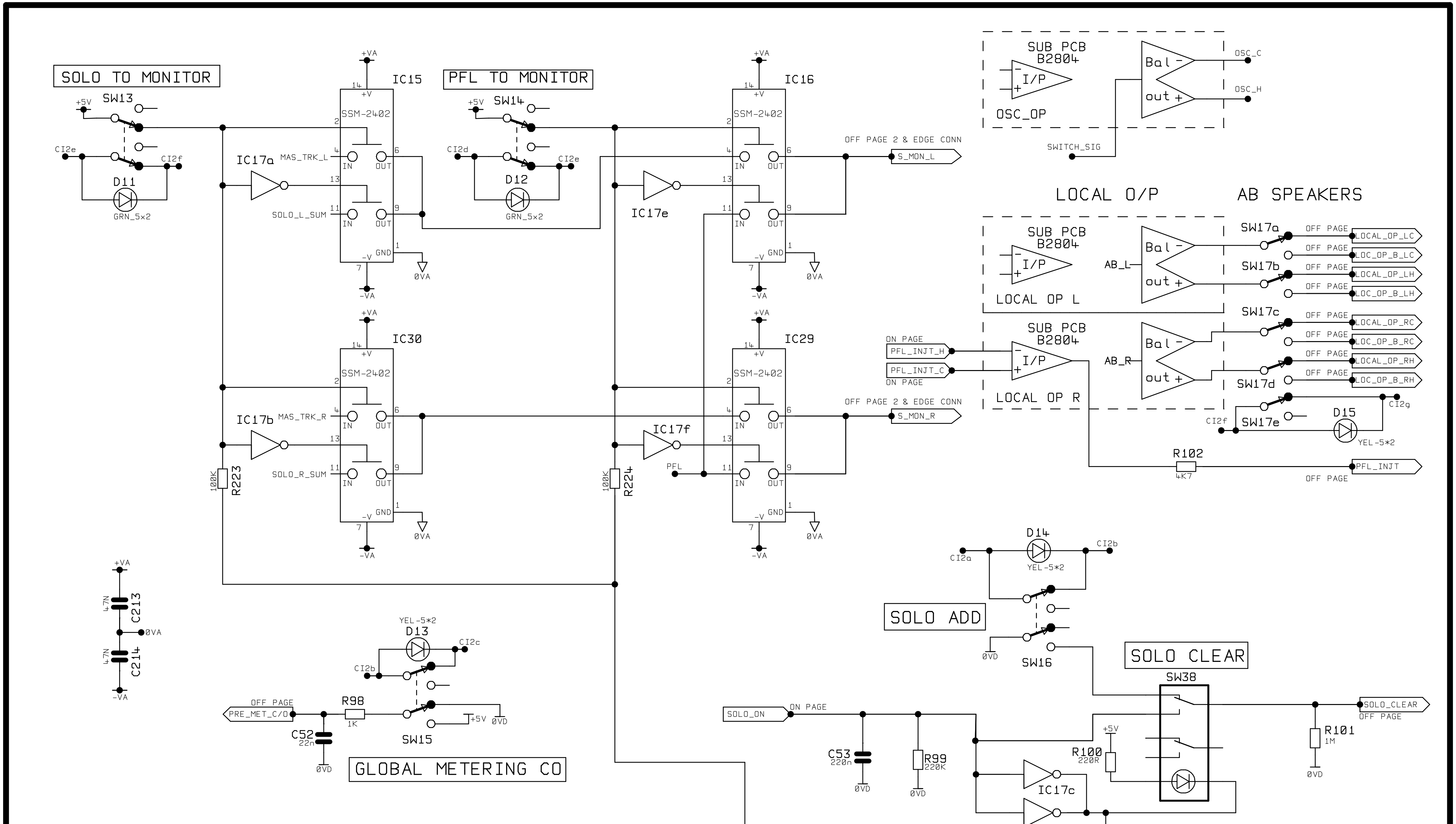
UNIT: XL431	MIDAS AUDIO		
TITLE: COMMS MODULE (SOLO, EDGE CONNECTORS, LED CHAIN CURRENT SOURCE & DECUPLING	DRAWN: JRC	DATE: 23-10-97	SHEET: 6 OF 6
BOARD No. B2785 BOARD Iss. 4	CHECKED:	SHEET Iss: 6	DRG No. XL431.SCH



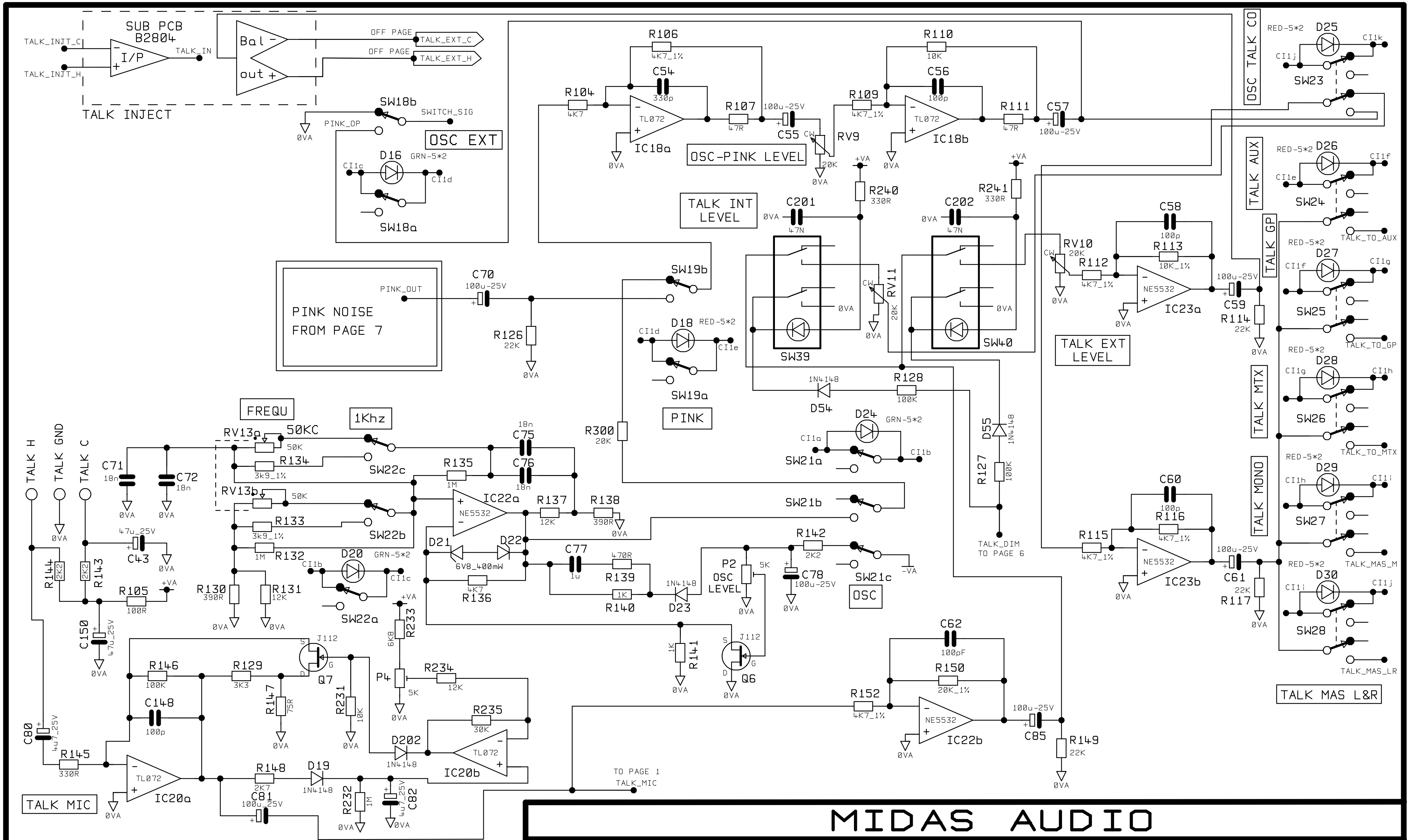
	MIDAS AUDIO		
Drawn: T.K.G	Checked: A.C	UNIT XL4	SONO COMMS	1 OF 7
BOARD No. XL432A 02	DWG No. XL432-01.DGM	ISSUE: 3	DATE: 26.5.99



	MIDAS AUDIO		
Drawn: T.K.G	Checked: A.C	UNIT XL4 SONO	SONO COMMS	2 OF 7
BOARD No. XL432A 02	DWG No. XL432-02.DGM	ISSUE: 3	DATE: 26.5.99

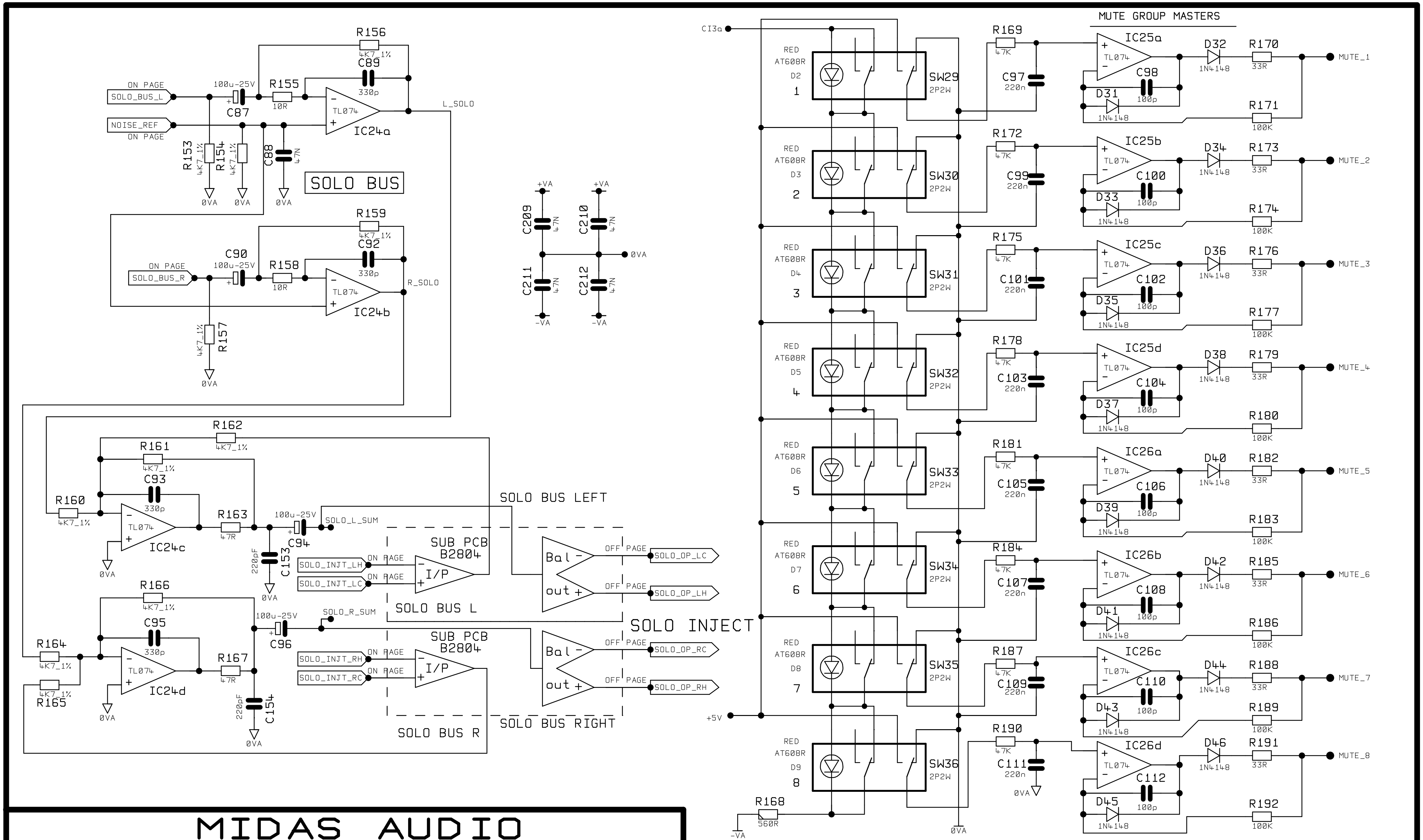


MIDAS AUDIO			
Drawn: T.K.G	Checked: A.C	SONO COMM	SOLO & MONITOR. / 3 OF 7
DATE: 26.5.99	ISSUE: 3	DWG No. XL432-03.DGM	BOARD No. XL432A 02



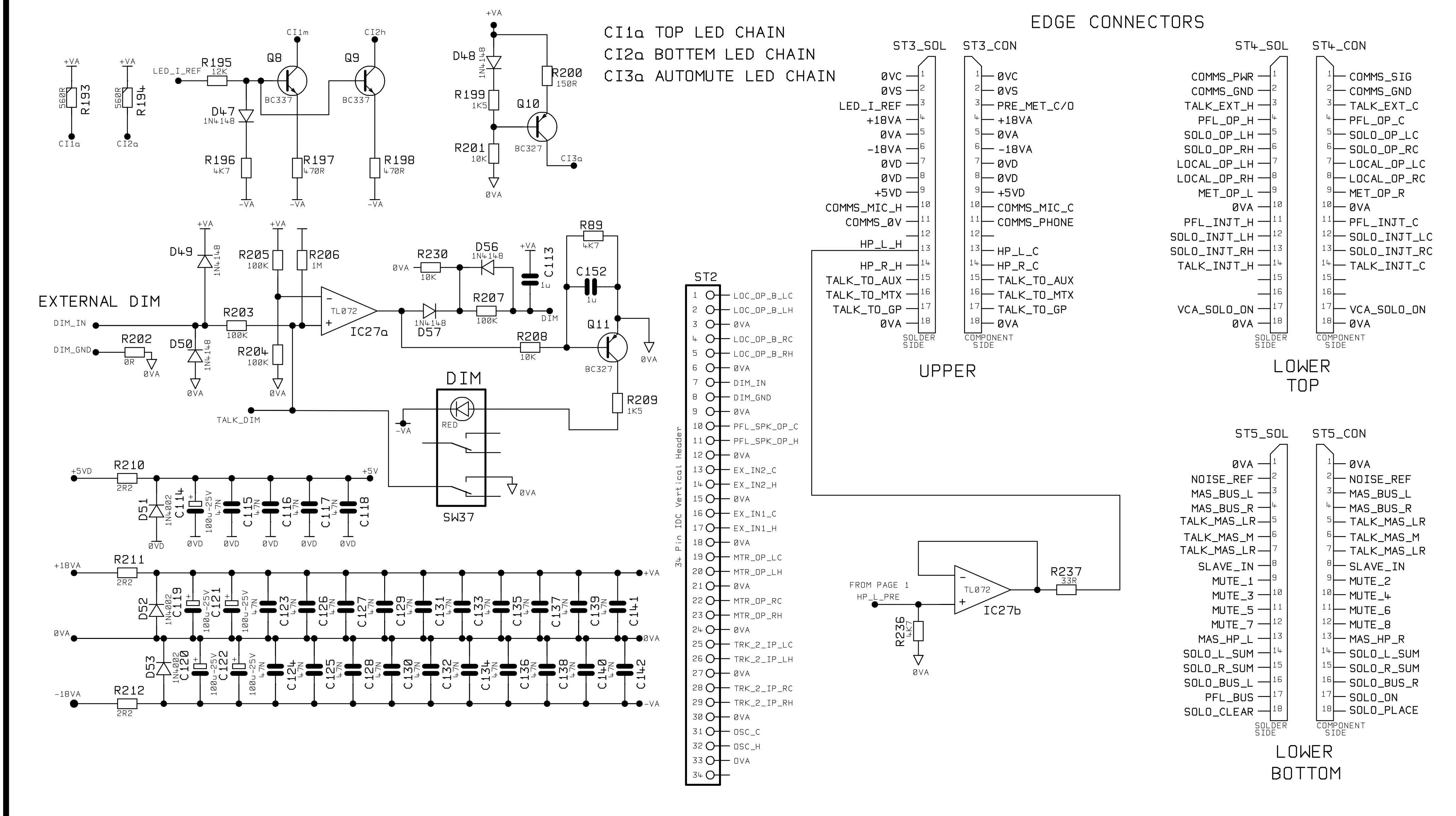
MIDAS AUDIO

Drawn: T.K.G	Checked: A.C	UNIT XL4	SONO COMMS	4 OF 7
BOARD No. XL432A 02	DWG No. XL432-04.DGM	ISSUE: 3	DATE: 26.5.99

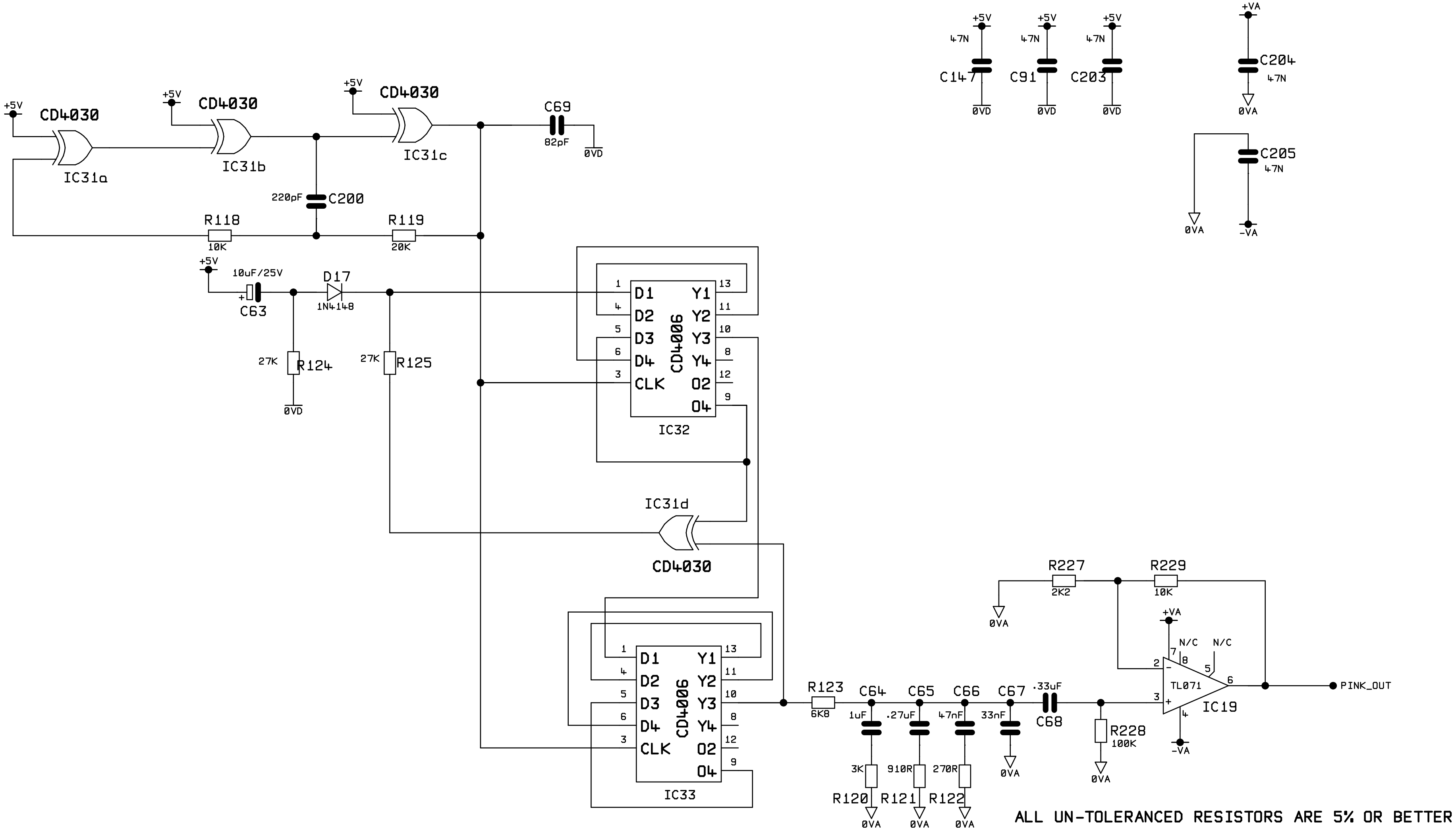


MIDAS AUDIO

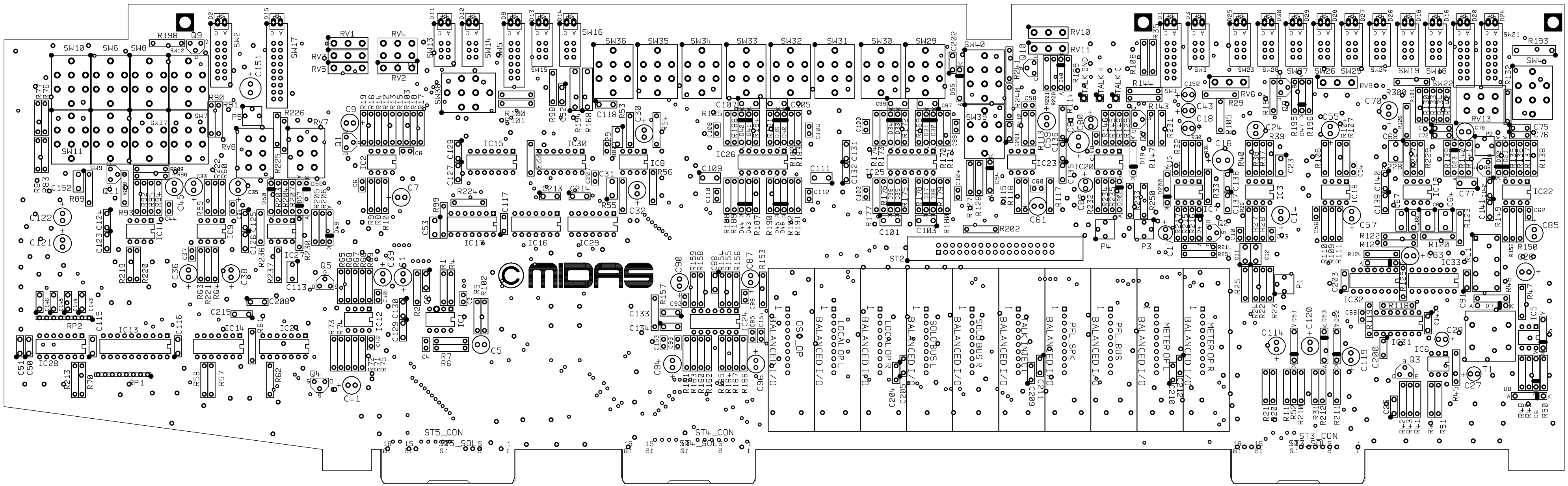
Drawn: T.K.G	Checked: A.C	XL4 COMM SONO	5 OF 7
DATE: 26.5.99	ISSUE: 3	DWG No. XL432-05.DGM	BOARD No. XL432A 02

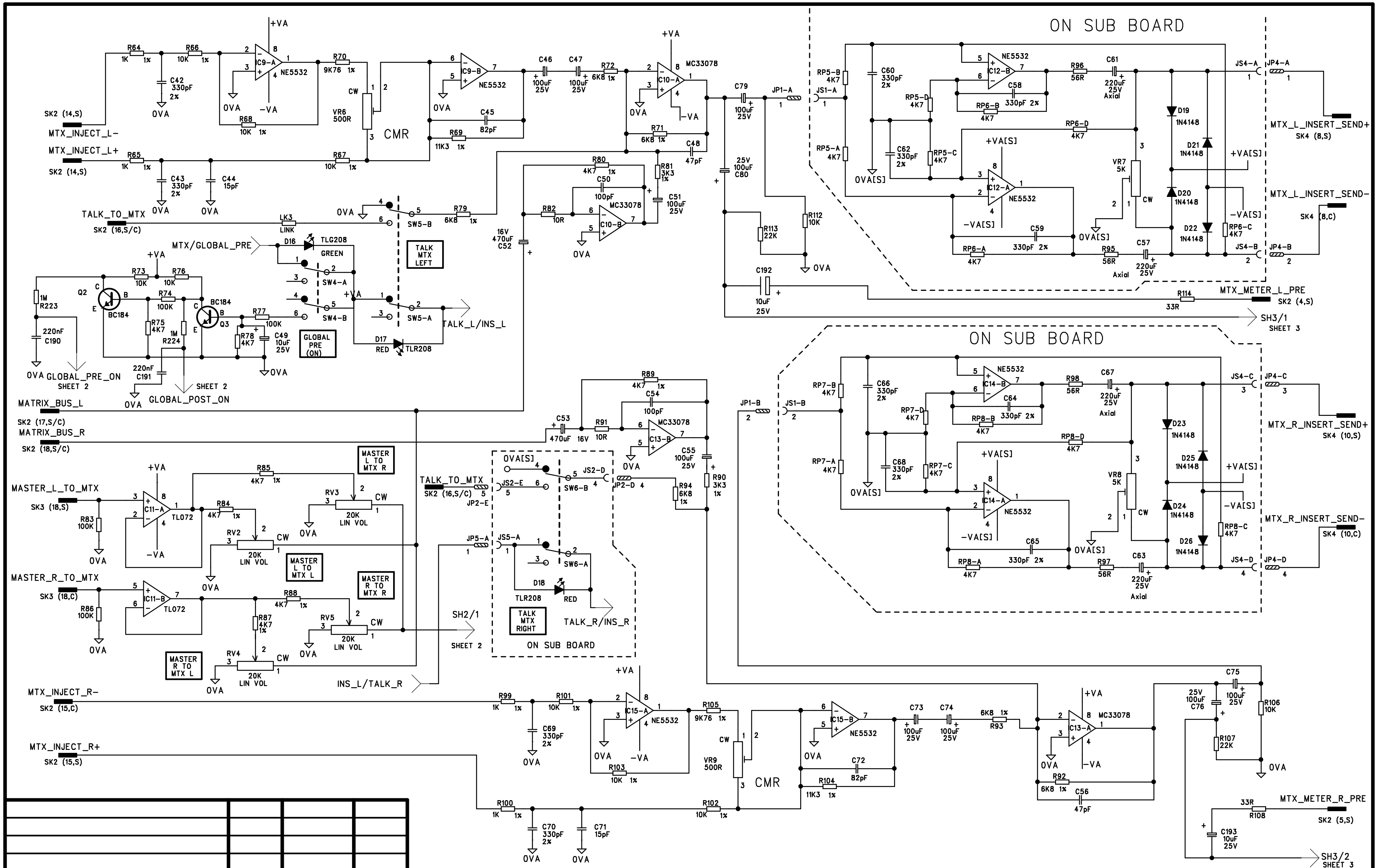


MIDAS AUDIO			
Drawn: T.K.G	Checked: C.R	UNIT XL4	EDGE CONNECTORS
BOARD No. XL432 02	DWG No. XL432-06.DGM	ISSUE: 3	DATE: 26.5.99



	MIDAS AUDIO		
Drawn: T.K.Gill	Checked:	UNIT: XL432 SONO COMMS	7 OF 7
BOARD No. XL432A02	DWG No. XL432_07.DGM	ISSUE: 3	DATE: 26.5.99


MIDAS
BALANCED I/O
OSC OP
LOCAL OP L
LOCAL OP R
SOLOBUS L
SOLOBUS R
TALK NET
PFL SPK
PFL BUS
METER OP L
METER OP R
ST5_CON
ST4_CON
ST3_CON
ST2

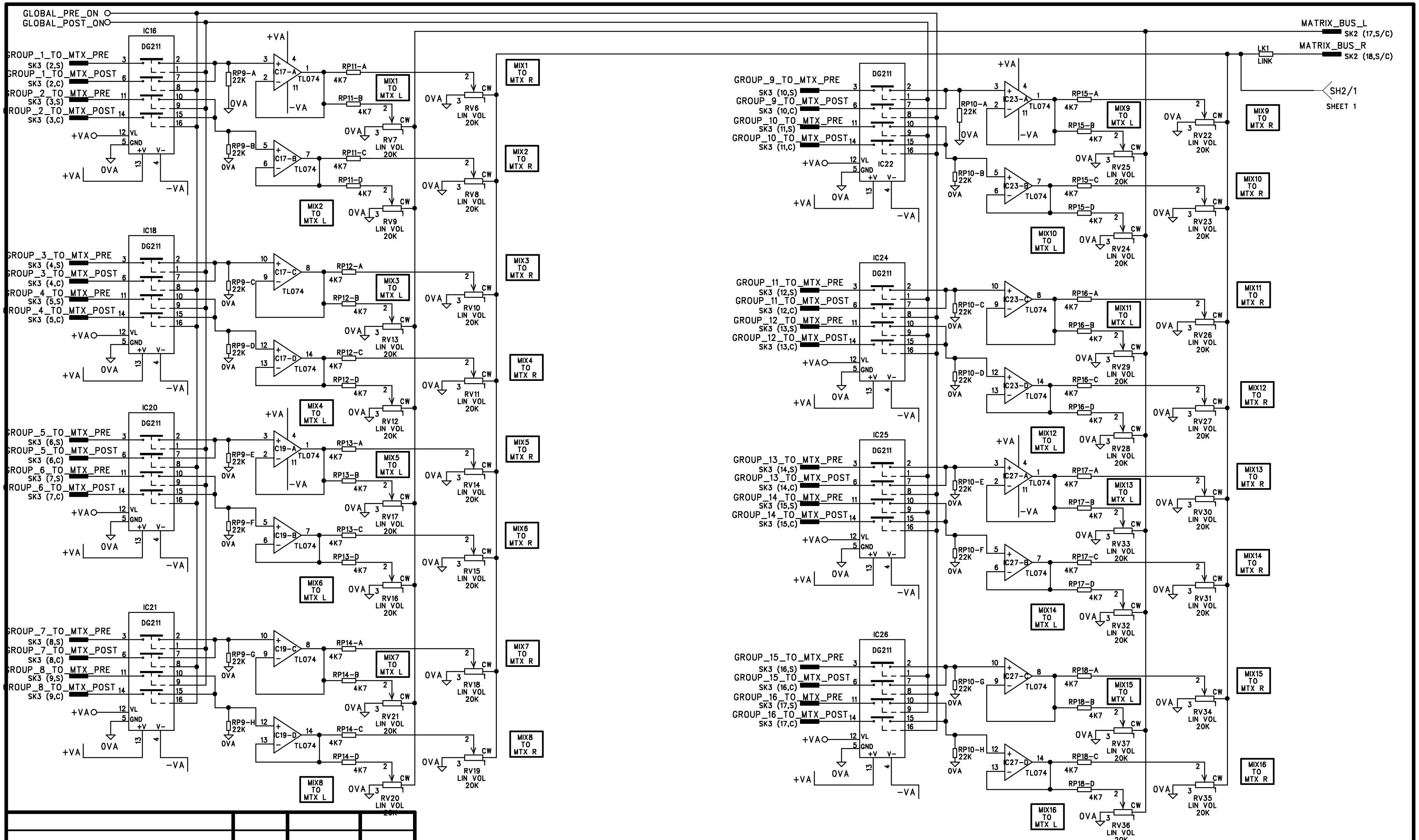


CHANGE TO BOARD PROFILE	4.	JRC.	21-3-95
CHANGE TO BOARD PROFILE	3.	JRC.	DEC 94
ADDED C192 & C193 @ 10uF 25v	2.	JRC.	11-11-94
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL441

MIDAS AUDIO

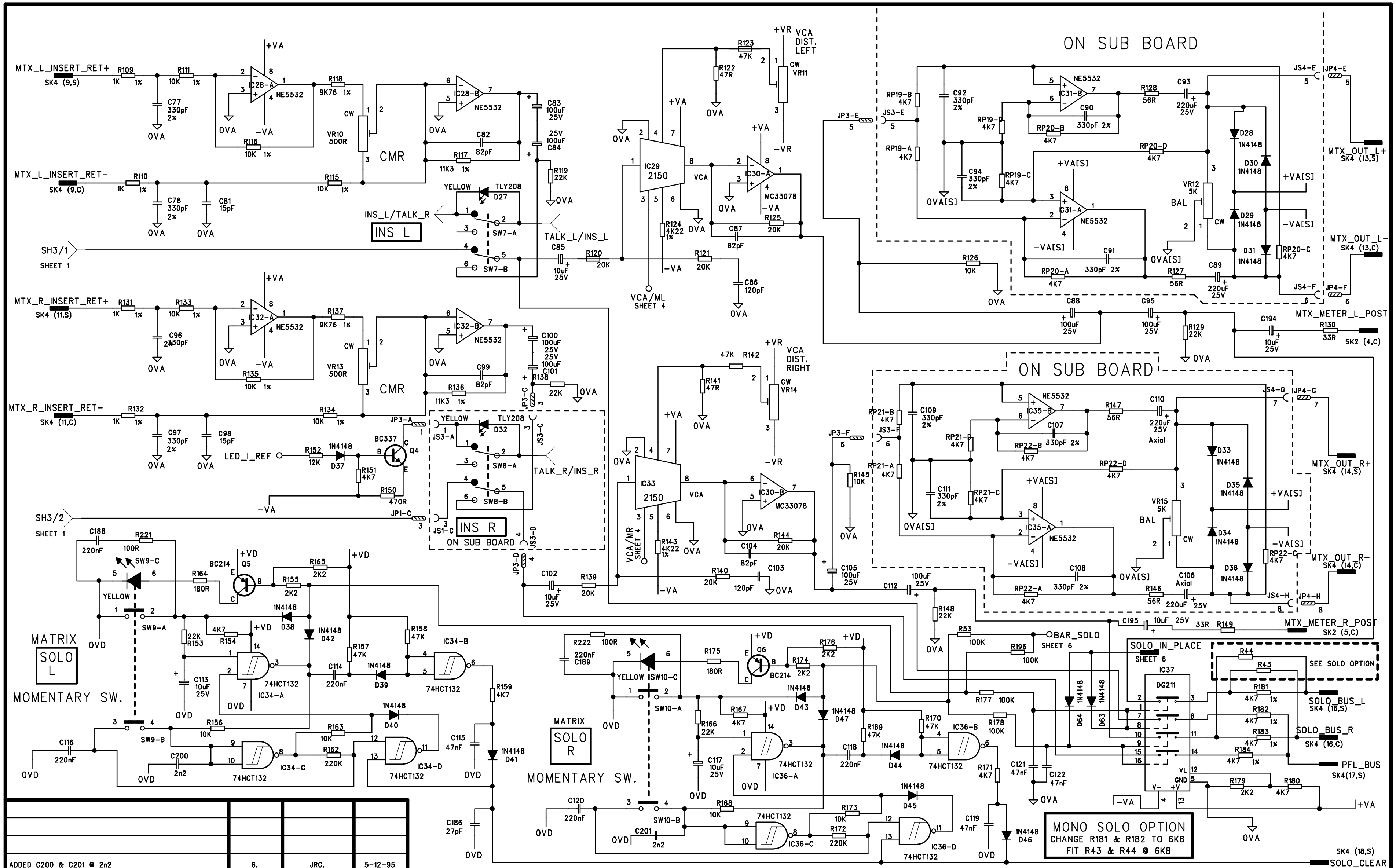
TITLE: MATRIX MODULE BUS SUMMING AND INSERT SEND	DRAWN: JRC	DATE: DEC 95	SHEET: 1 of 6
BOARD No. B2774 BOARD Iss. 6 / B2783 BOARD Iss. 4	CHECKED:	SHEET ISS: 6	DRG No. XL441.SCH



AMMENDMENTS	ISS.	INIT.	DATE.

MIDAS AUDIO

UNIT: XL441			
TITLE: MATRIX MODULE GLOBAL PRE SWITCHING	DRAWN: JRC	DATE: DEC 95	SHEET: 2 OF 6
BOARD No. B2774 BOARD Iss. 6 B2783 BOARD Iss. 4	CHECKED:	SHEET ISS: 6	DRG No. XL441.SCH



ADDED C200 & C201 @ 2n2	6.	JRC.	5-12-95
ADDED D63 & D64 TO IC37.8 & IC37.9 AND SK4.18C	6.	JRC.	5-12-95
CHANGED R164 &R175 TO 180R	5.	JRC.	18-9-95
PUT R183 BACK ON BOARD TO RECTIFY PREVIOUS ERROR	4.	JRC.	21-3-95
CHANGED R157,R158,R169 & R170 TO 47K	2.	JRC.	11-11-94
CHANGED R162 & R172 TO 220K & R159 & R171 TO 4K7	2.	JRC.	11-11-94
ADDED C194 & C195 @ 10uF 25v	2.	JRC.	11-11-94
AMMENDMENTS	ISS.	INIT.	DATE.

MIDAS AUDIO

UNIT: XL441

TITLE: MATRIX MODULE VCA'S SOLO INSERT RET. AND OUTPUT

BOARD No. B2774 BOARD Iss. 6
B2783 BOARD Iss. 4

DRAWN: JRC

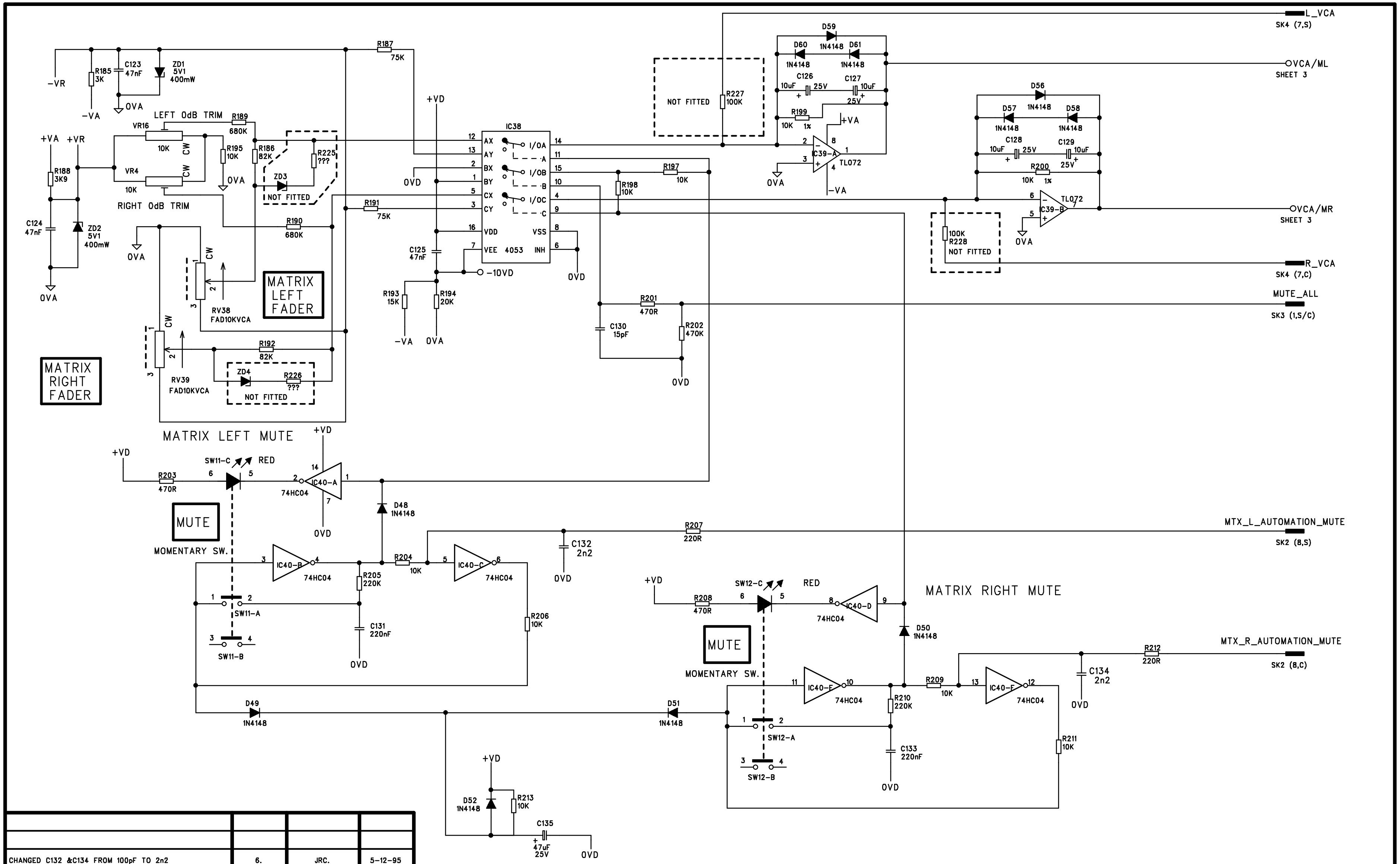
CHECKED:

DATE: DEC 95

SHEET ISS: 6

SHEET: 3 OF 6

DRG No. XL441.SCH



CHANGED C132 &C134 FROM 100pF TO 2n2	6.	JRC.	5-12-95
CHANGED R207 & R212 FROM 100R TO 220R	6.	JRC.	5-12-95
CHANGED SIGNAL NAMES VCA_DC_L &	5.	JRC.	18-9-95
VCA_DC_R TO L_VCA & R_VCA	5.	JRC.	18-9-95
CHANGED R203 & R208 TO 470R	5.	JRC.	18-9-95
ADDED ZD3, ZD4, R225, R226, R227 & R228	4.	JRC.	21-3-95
CHANGED C125 TO 47nF	4.	JRC.	21-3-95
CHANGED R205 & R210 TO 220K	2.	JRC.	11-11-94
AMMENDMENTS	ISS.	INIT.	DATE.

MIDAS AUDIO

UNIT: XL441

TITLE: MATRIX MODULE VCA CONTROL VOLTAGE AND MUTE

BOARD No. B2774 BOARD Iss. 6
B2783 BOARD Iss. 4

DRAWN: JRC

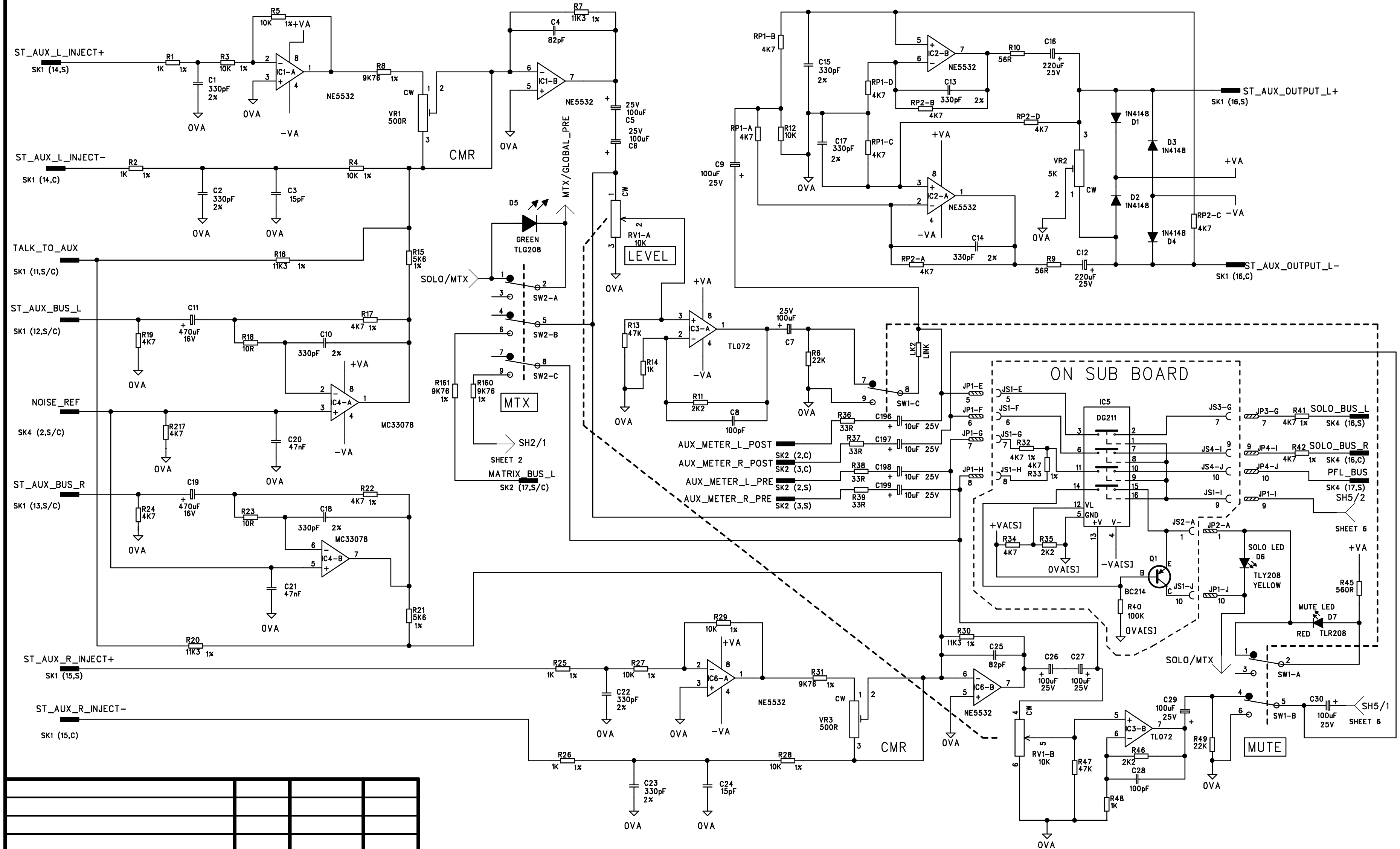
CHECKED:

DATE: DEC 95

SHEET ISS: 6

SHEET: 4 OF 6

DRG No. XL441.SCH



UNIT: XL441

MIDAS AUDIO

TITLE: MATRIX MODULE AUX SENDS

DRAWN: JRC

DATE: DEC 95

SHEET: 5 OF 6

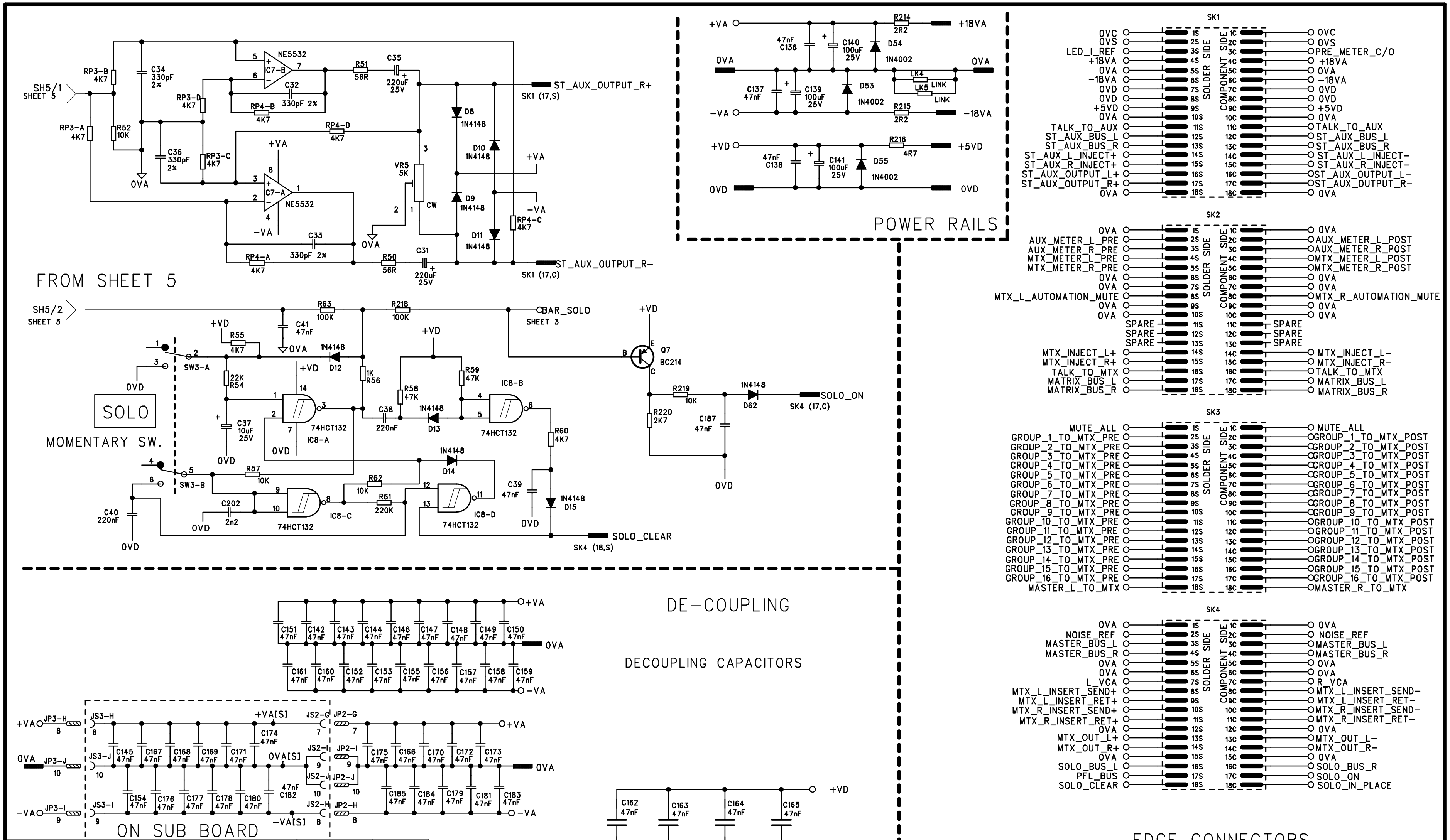
BOARD No. B2774 BOARD Iss. 6
B2783 BOARD Iss. 4

CHECKED:

SHEET ISS: 6

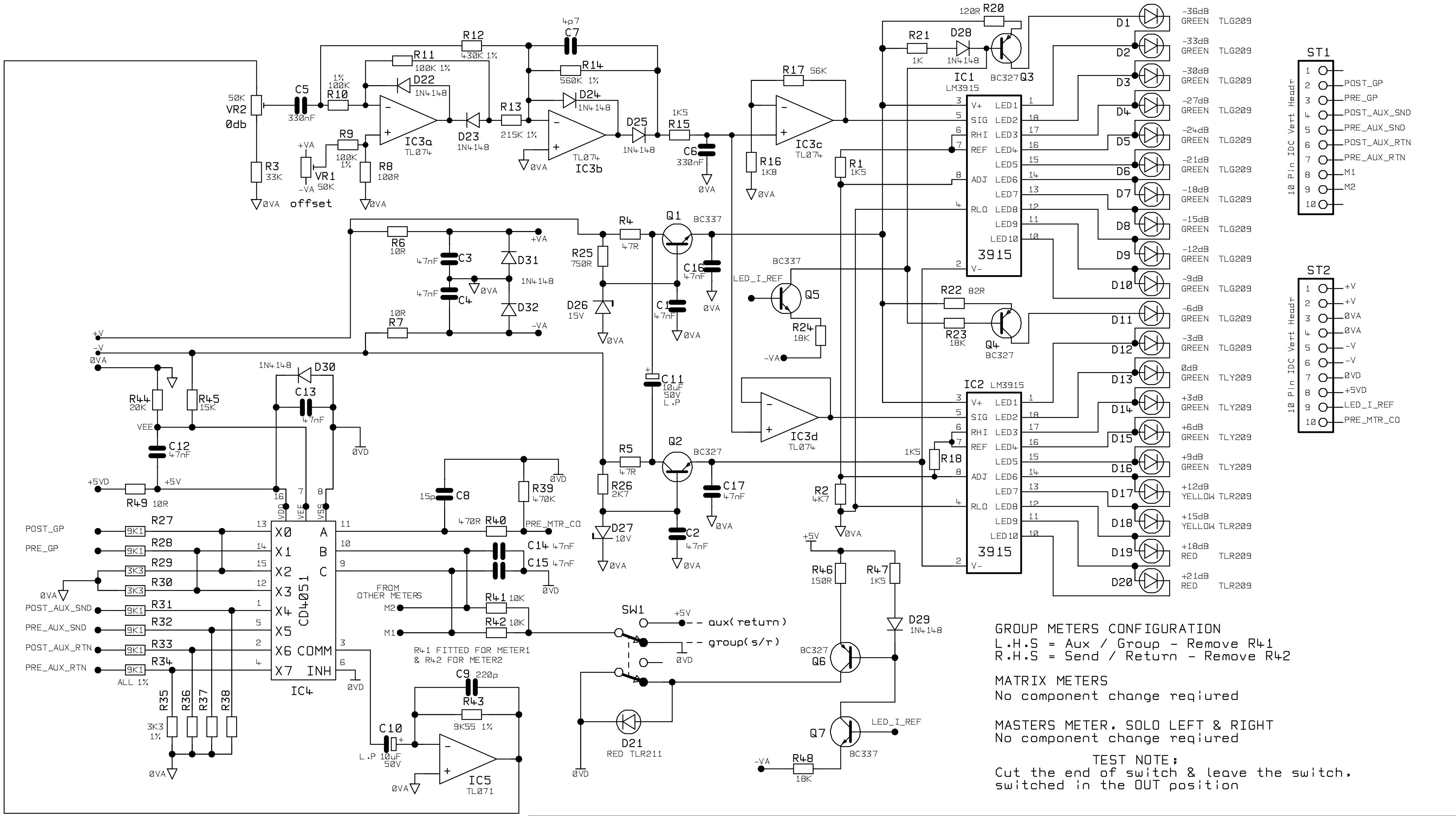
DRG No. XL441.SCH

ADDED C196,C197,C198 & C199 @ 10uF 25v	2.	JRC.	11-11-94
AMMENDMENTS	ISS.	INIT.	DATE.



ADDED C202 @ 2n2	6.	JRC.	5-12-95
CHANGED NETS VCA_DC_L & VCA_DC_R TO L_VCA & R_VCA	5.	JRC.	18-9-95
ADDED NETS VCA_DC_L & VCA_DC_R TO SK4	4.	JRC.	21-3-95
CHANGED R214 & R215 TO 2R2	4.	JRC.	21-3-95
CHANGED R61 TO 220K, R60 TO 4K7, R58 & R59 TO 47K	2.	JRC.	11-11-94
AMMENDMENTS	ISS.	INIT.	DATE.

UNIT: XL441	MIDAS AUDIO		
TITLE: MATIX MODULE AUX SENDS, DE-COUPLING AND EDGE CONNECTORS.	DRAWN: JRC	DATE: DEC 95	SHEET: 6 OF 6
BOARD No. B2774 BOARD Iss. 6 / B2783 BOARD Iss. 4	CHECKED:	SHEET ISS: 6	DRG No. XL441.SCH



GROUP METERS CONFIGURATION
L.H.S = Aux / Group - Remove R41
R.H.S = Send / Return - Remove R42

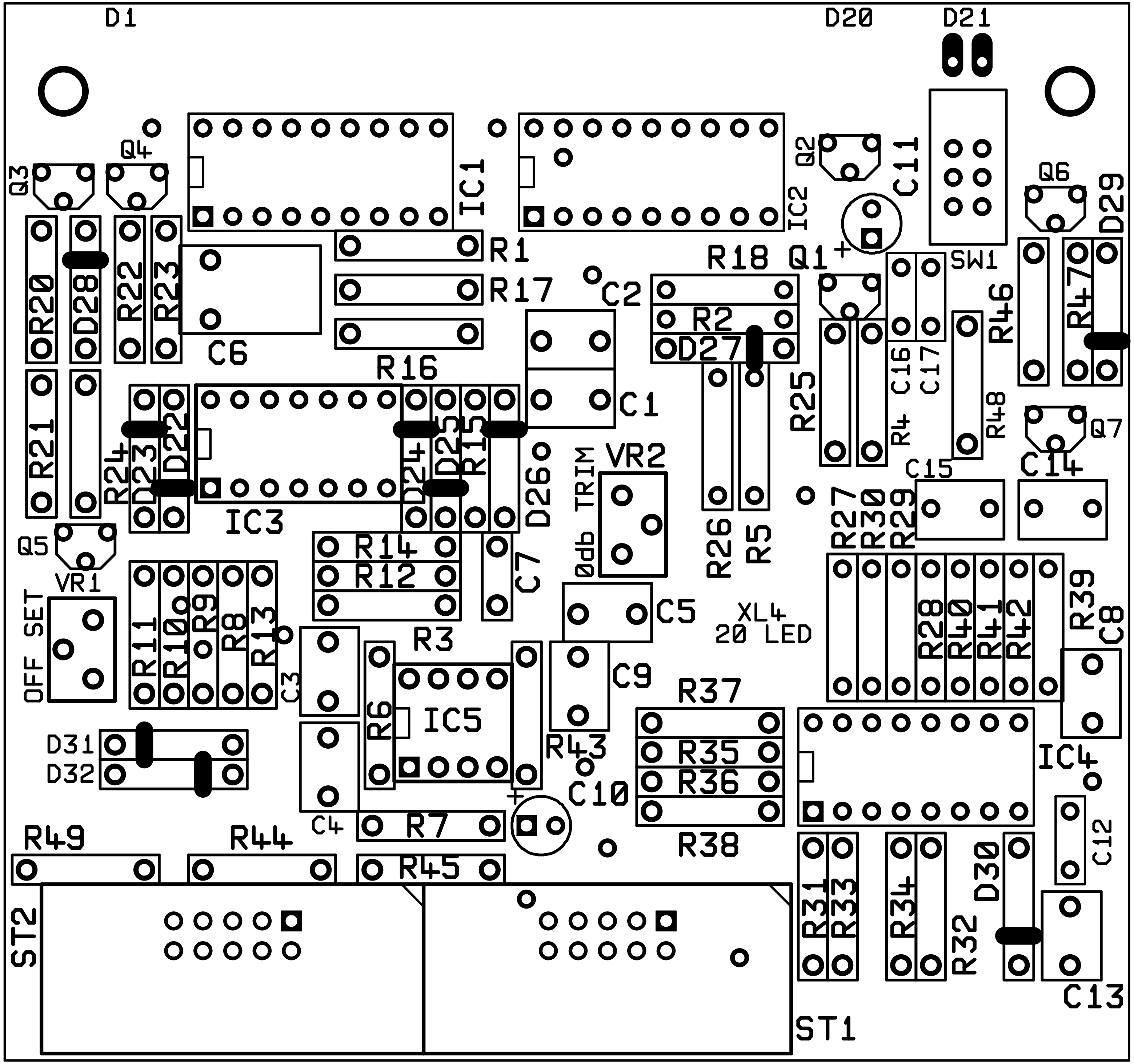
MATRIX METERS
No component change reqiured

MASTERS METER, SOLO LEFT & RIGHT
No component change reqiured

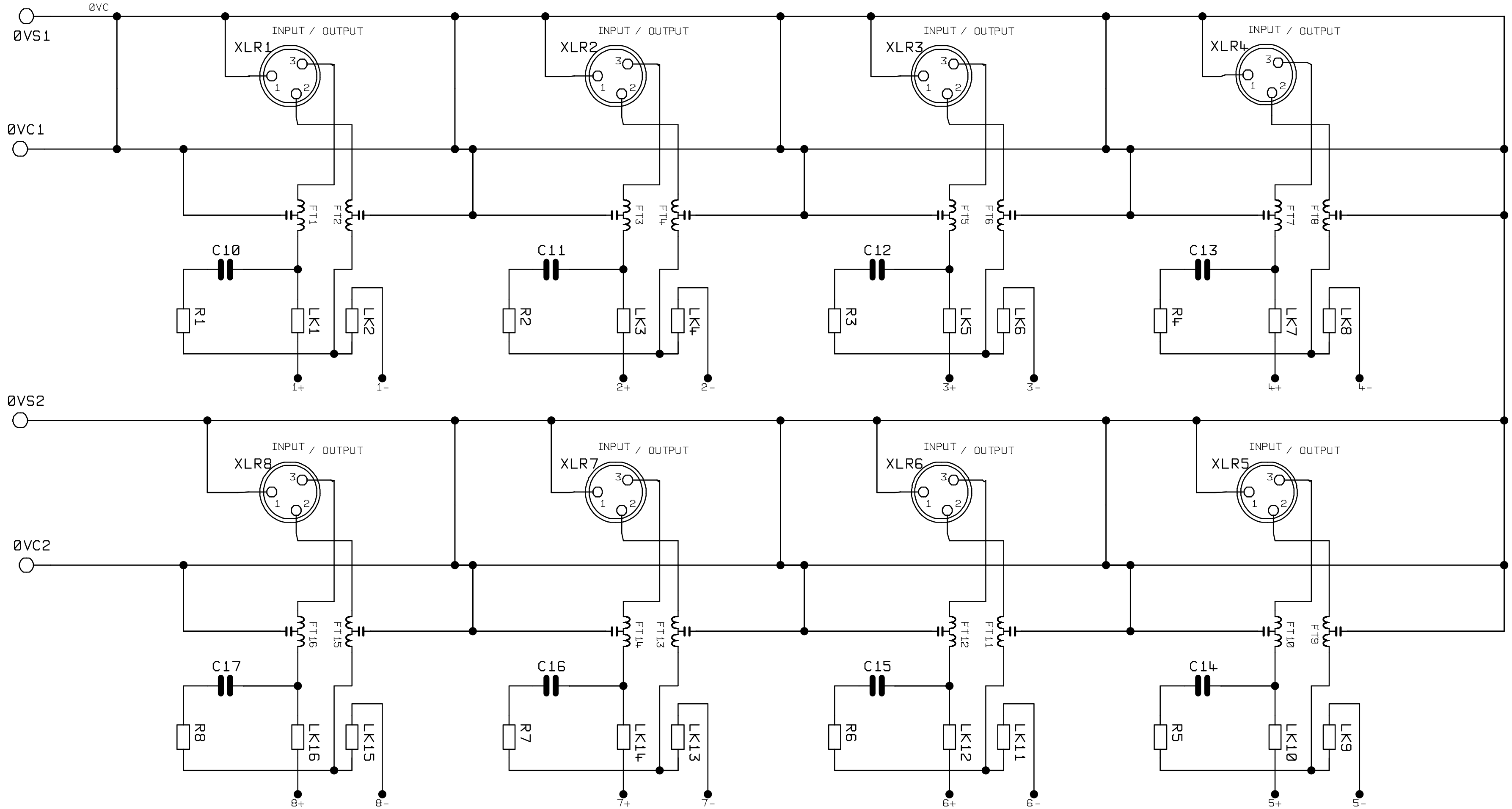
TEST NOTE:
Cut the end of switch & leave the switch,
switched in the OUT position

MIDAS AUDIO

Drawn: T.K.G	Checked: A.C	UNIT XL4	20 LED/SWITCHING	1 OF 1
BOARD No. B2761IS2		DWG No. XL4LED.DGM	ISSUE: 3	DATE: 23.8.96

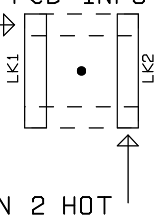


D1
D20
D21
Q3
Q4
IC1
IC2
Q2
C11
Q6
D29
SW1
R1
R17
C2
R18 Q1
R20
D28
R22
R23
C6
R16
R2
D27
R25
C16
C17
R46
R47
R4
R48
C1
R21
R24
D23
D22
IC3
D24
D25
R15
D26
VR2
0db TRIM
R26
R5
R27
R30
R29
C15
C14
Q7
Q5
R14
R12
C7
VR1
OFF SET
R11
R10
R9
R8
R13
C3
R3
C5
XL4
20 LED
R28
R40
R41
R42
R39
C8
IC5
R6
C9
R37
R43
R35
R36
IC4
D31
D32
C10
C4
R7
R38
C12
R49
R44
R45
R31
R33
R34
R32
D30
ST2
C13
ST1



PCB INFO

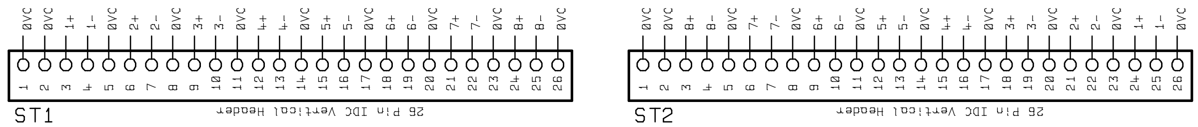
WIRE PIN 3 HOT



PHASE CHANGE OPTION
PIN 2 HOT FIT LK1+2 TO DASH BOX
PIN 3 HOT FIT LK1+2 TO SOLID BOX

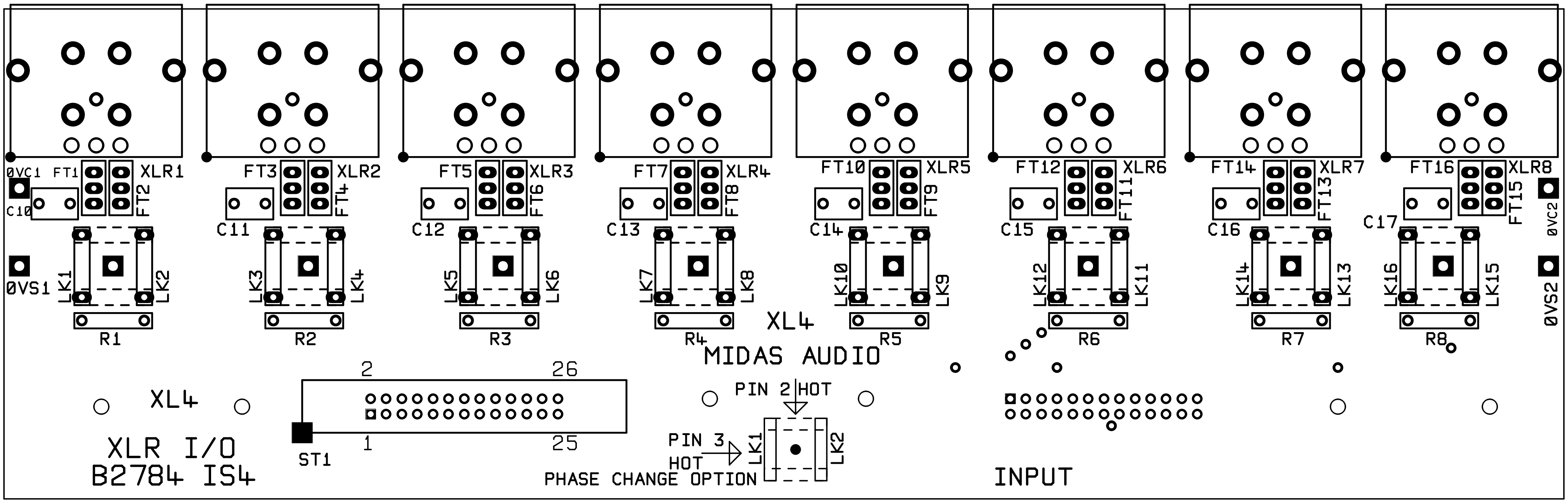
WIRE PIN 2 HOT

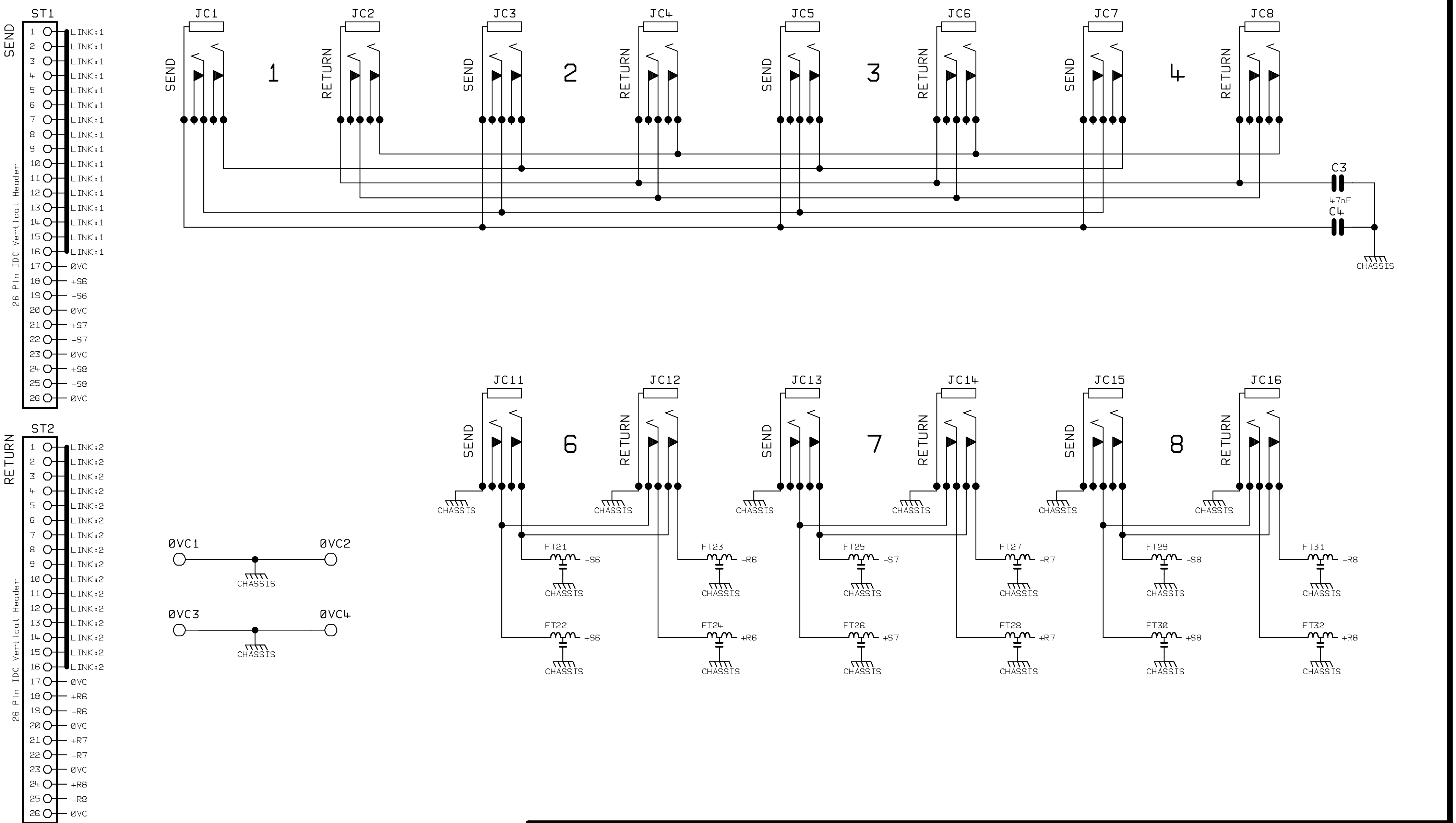
ONLY ONE IDC TO BE USED
ST1 FOR INPUT OR ST2 FOR OUTPUT



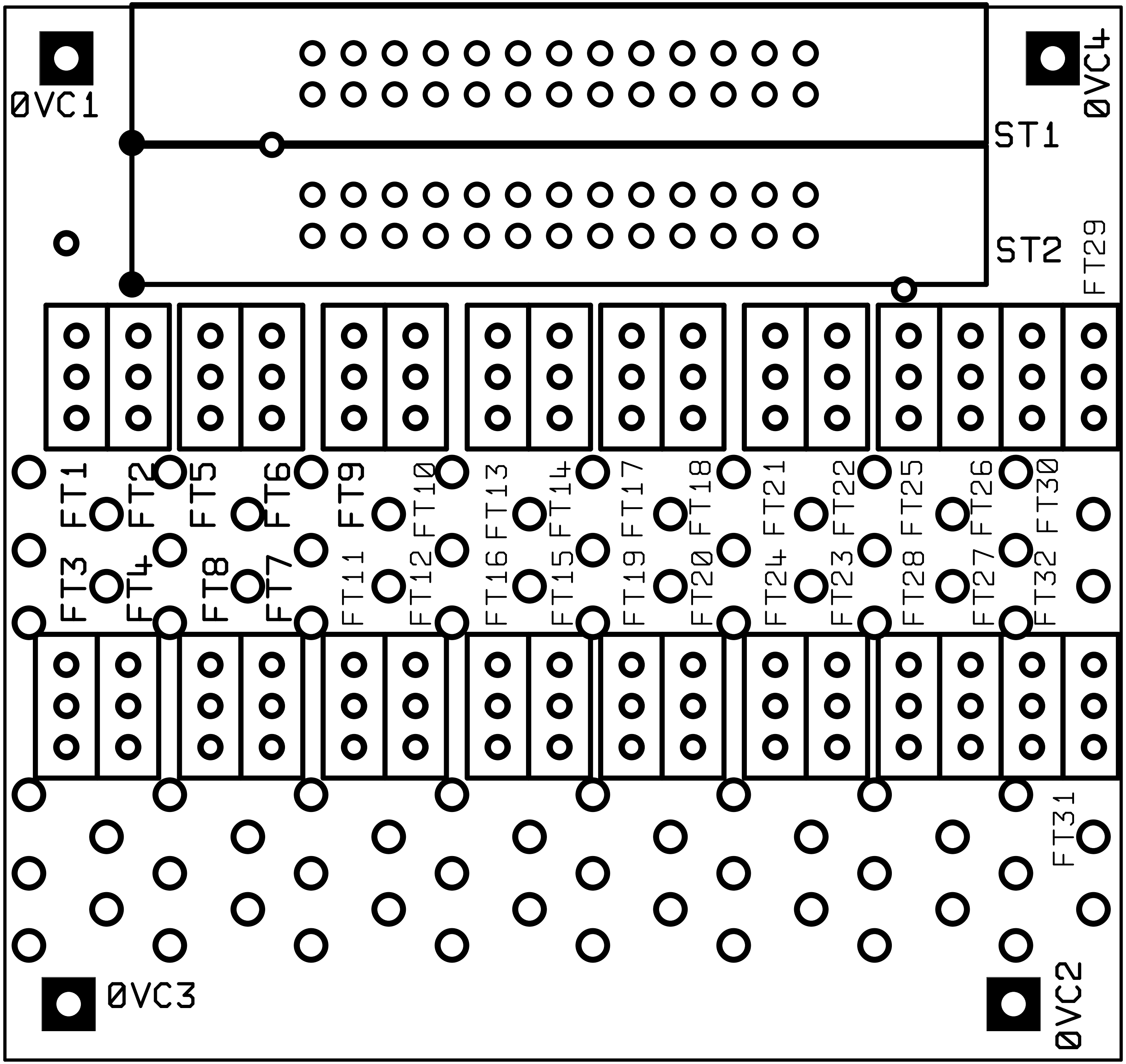
REMOVE LINKS TO WIRE UP SCREEN CABLE

		MIDAS AUDIO		
Drawn: T.K.G	Checked: A.C.	UNIT XL4	I/O XLR P.C.B	1 OF 1
BOARD No. B2784 IS4		DWG No. XL4_XLR.DGM	ISSUE: 2	DATE: 16.1.96

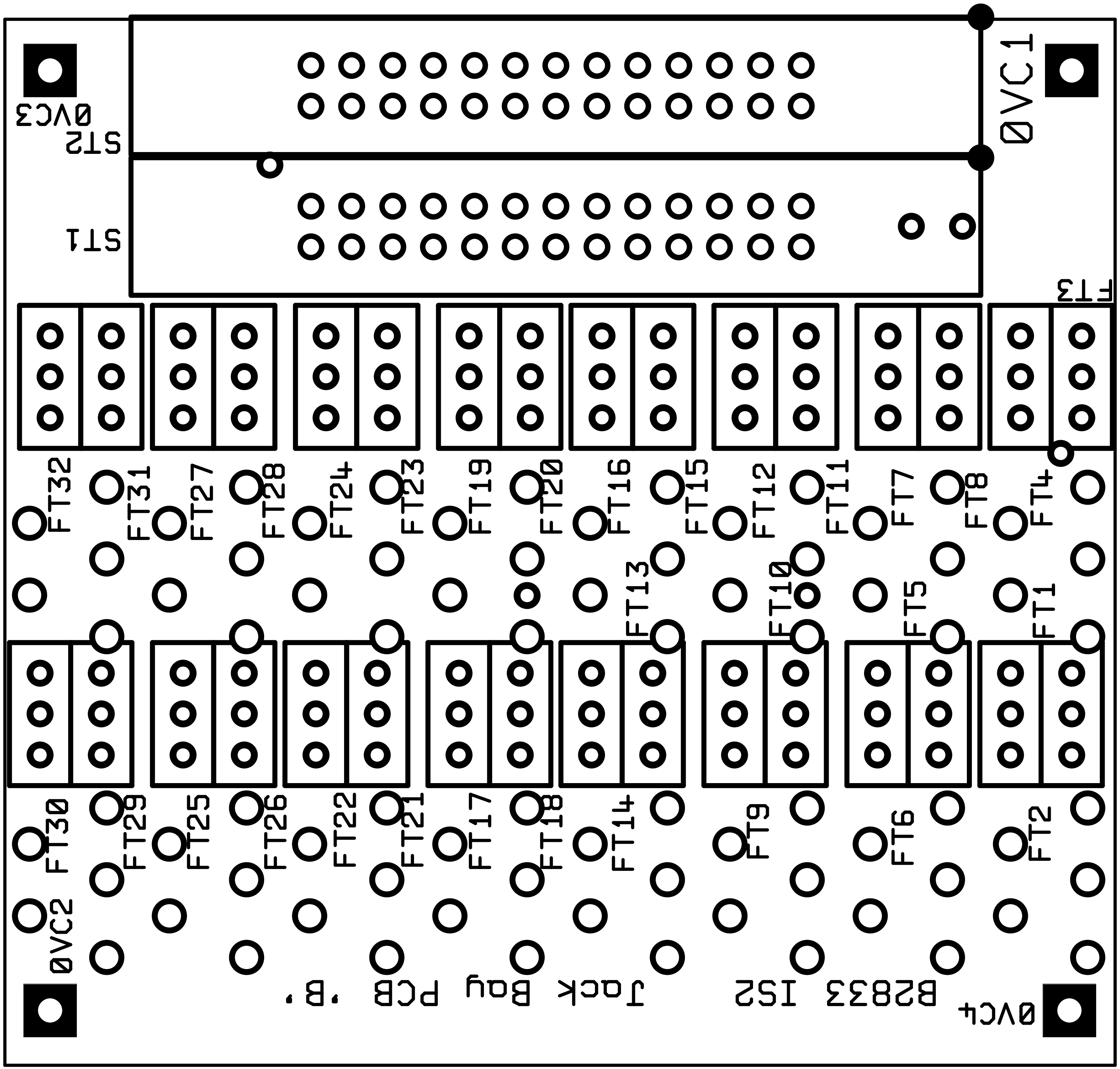

XLR1
XLR2
XLR3
XLR4
XLR5
XLR6
XLR7
XLR8
ØVC1
FT1
FT2
FT3
FT4
FT5
FT6
FT7
FT8
FT9
FT10
FT11
FT12
FT13
FT14
FT15
FT16
ØVC2
C10
C11
C12
C13
C14
C15
C16
C17
ØVS1
ØVS2
LK1
LK2
LK3
LK4
LK5
LK6
LK7
LK8
LK9
LK10
LK11
LK12
LK13
LK14
LK15
LK16
R1
R2
R3
R4
R5
R6
R7
R8
XL4
MIDAS AUDIO
2
26
1
25
ST1
XL4
XLR I/O
B2784 IS4
PIN 2 HOT
PIN 3
HOT
LK1
LK2
PHASE CHANGE OPTION
INPUT



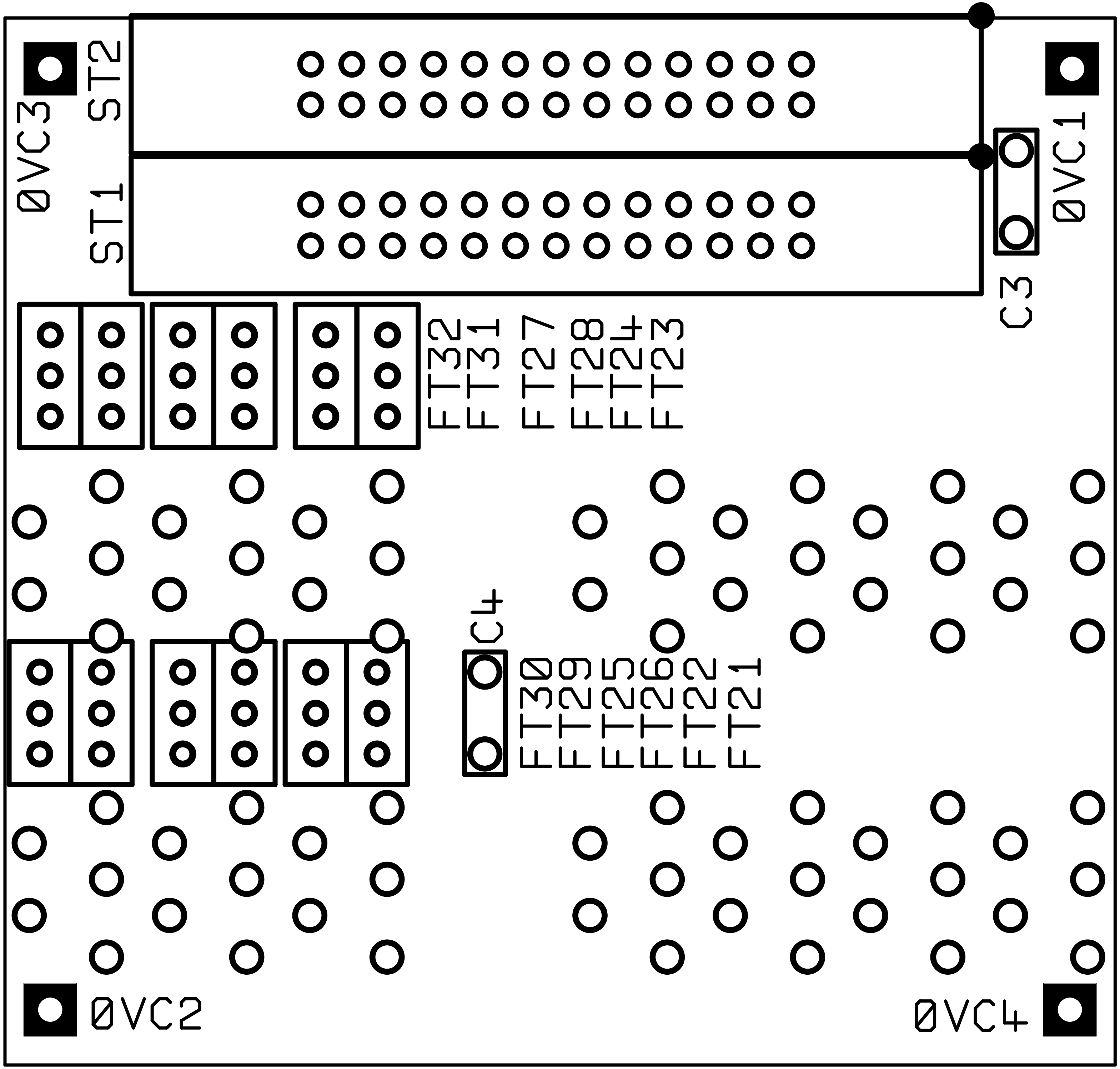
		MIDAS AUDIO		
Drawn: T.K.G	Checked: A.C	UNIT XL4	JACK BAY FIELD	1 OF 1
BOARD No. B2835 IS2		DWG No. JBAYLINK.DGM	ISSUE: 2	DATE: 12.2.96



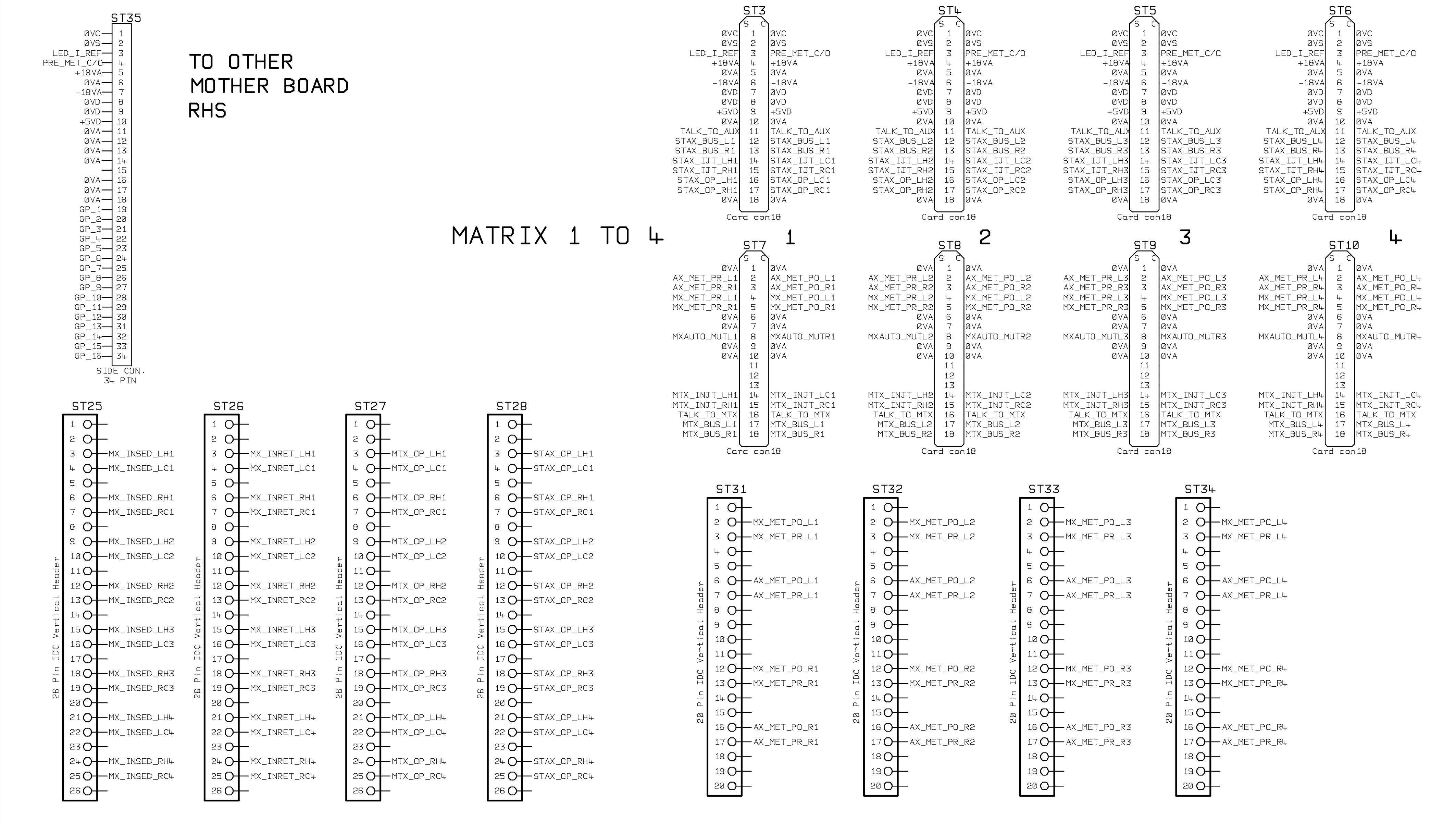
0VC1
0VC4
ST1
ST2
FT29
FT1
FT2
FT5
FT6
FT9
FT10
FT13
FT14
FT17
FT18
FT21
FT22
FT25
FT26
FT30
FT3
FT4
FT8
FT7
FT11
FT12
FT16
FT15
FT19
FT20
FT24
FT23
FT28
FT27
FT32
FT31
0VC3
0VC2



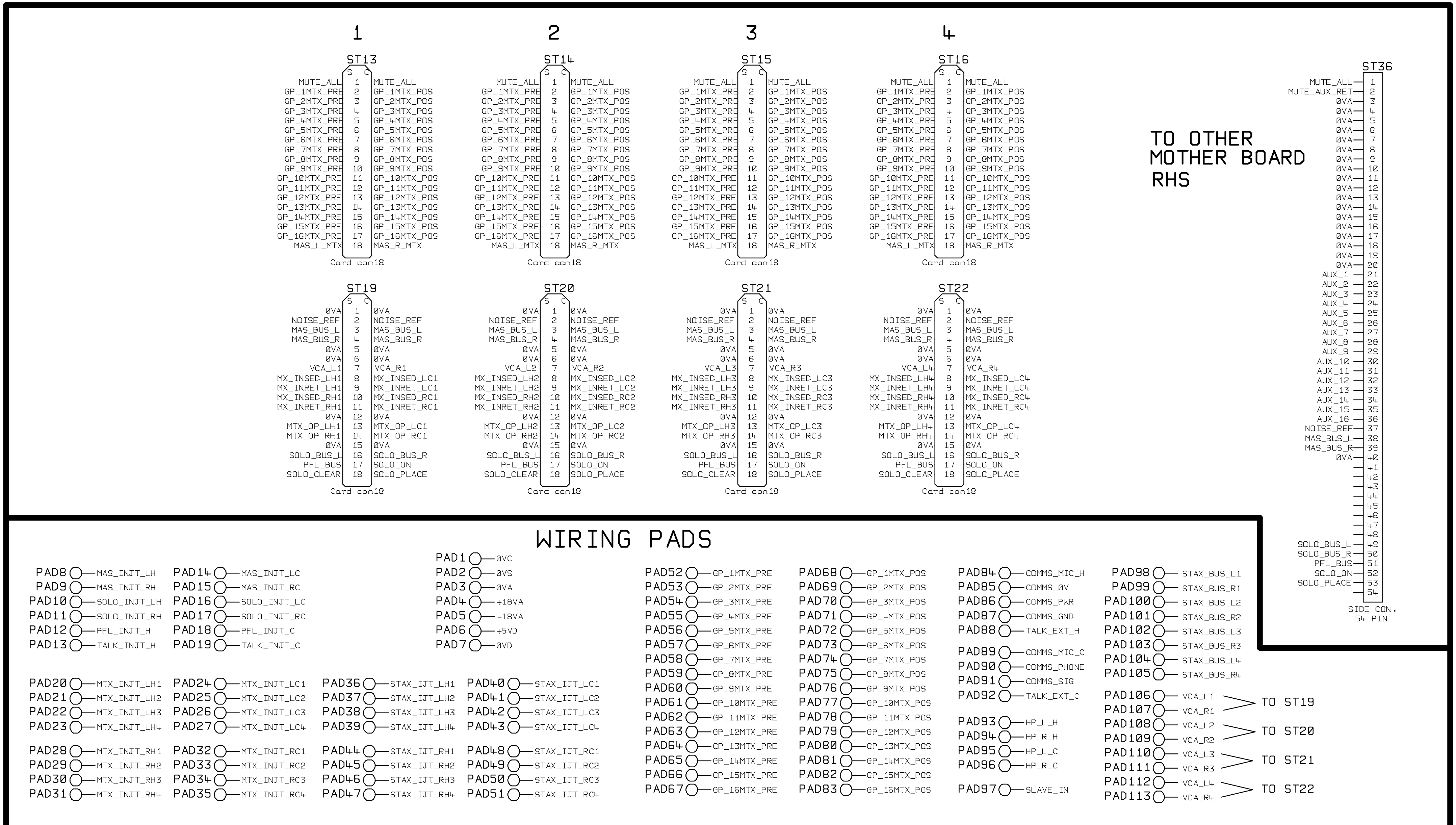
ØVC1
ØVC2
ØVC3
ØVC4
ST1
ST2
FT1
FT2
FT3
FT4
FT5
FT6
FT7
FT8
FT9
FT10
FT11
FT12
FT13
FT14
FT15
FT16
FT17
FT18
FT19
FT20
FT21
FT22
FT23
FT24
FT25
FT26
FT27
FT28
FT29
FT30
FT31
FT32
B2833 IS2 Jack Bay PCB 'B'



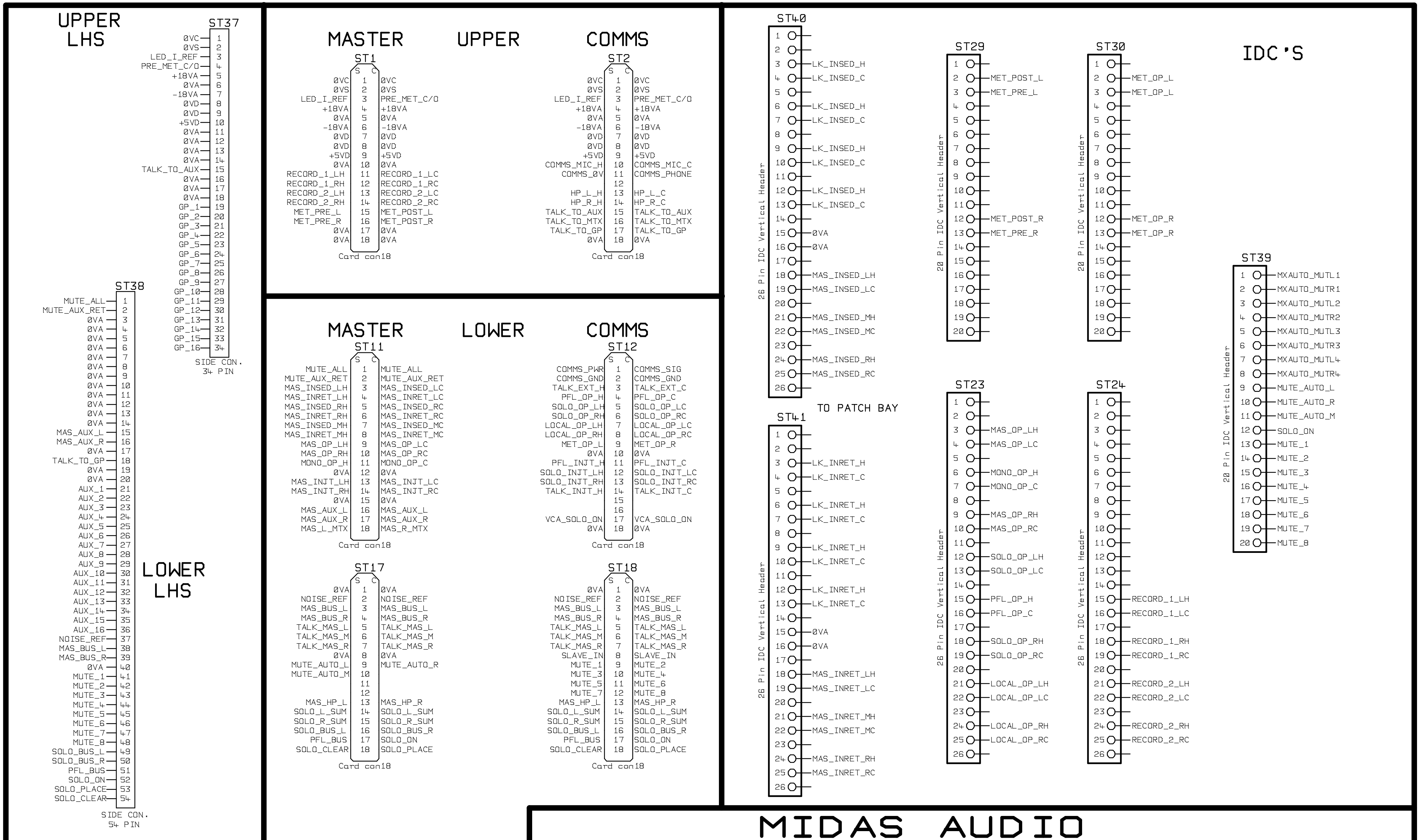
0VC3
ST2
ST1
0VC1
C3
FT32
FT31
FT27
FT28
FT24
FT23
C4
FT30
FT29
FT25
FT26
FT22
FT21
0VC2
0VC4



		MIDAS AUDIO		
Drawn: T.K.G	Checked: A.C	UNIT XL4	MTX MOTHER UPPER CONNECTORS	1 OF 3
BOARD No. B2781 IS3		DWG No. XL4_MTX1.DGM	ISSUE: 3	DATE: 27.9.95

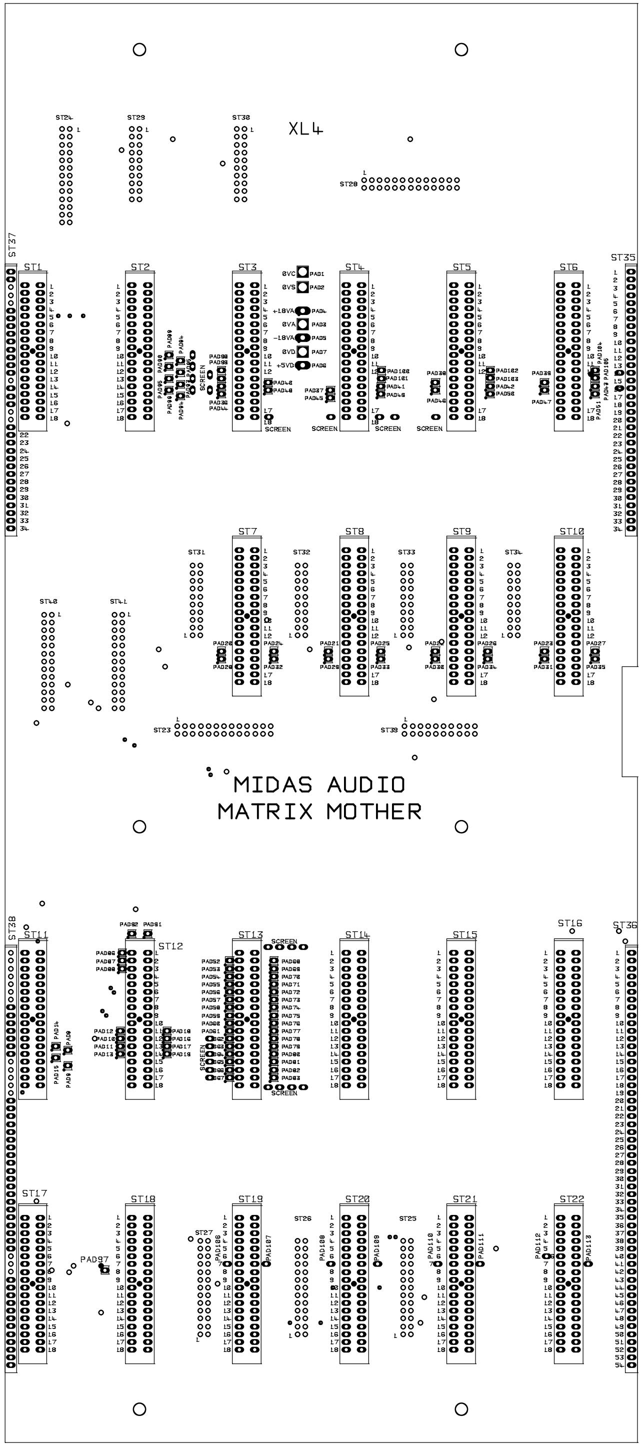


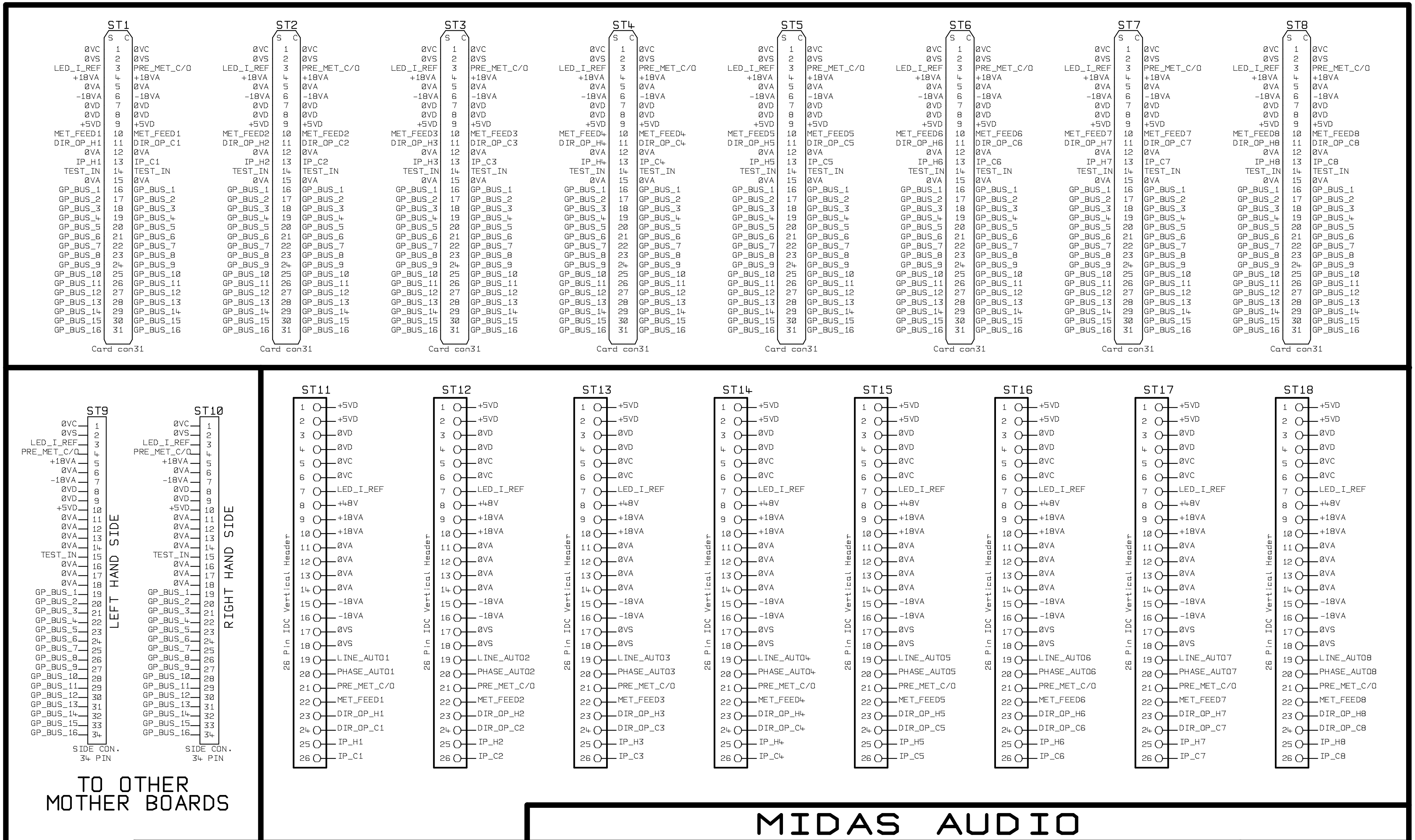
MIDAS AUDIO			
Drawn: T.K.G	Checked: A.C	UNIT XL4	MTX MOTHER LOWER CONNECTORS — 2 OF 3
BOARD No. B2781 IS3	DWG No. XL4_MTX2.DGM	ISSUE: 3	DATE: 27.9.95



MIDAS AUDIO

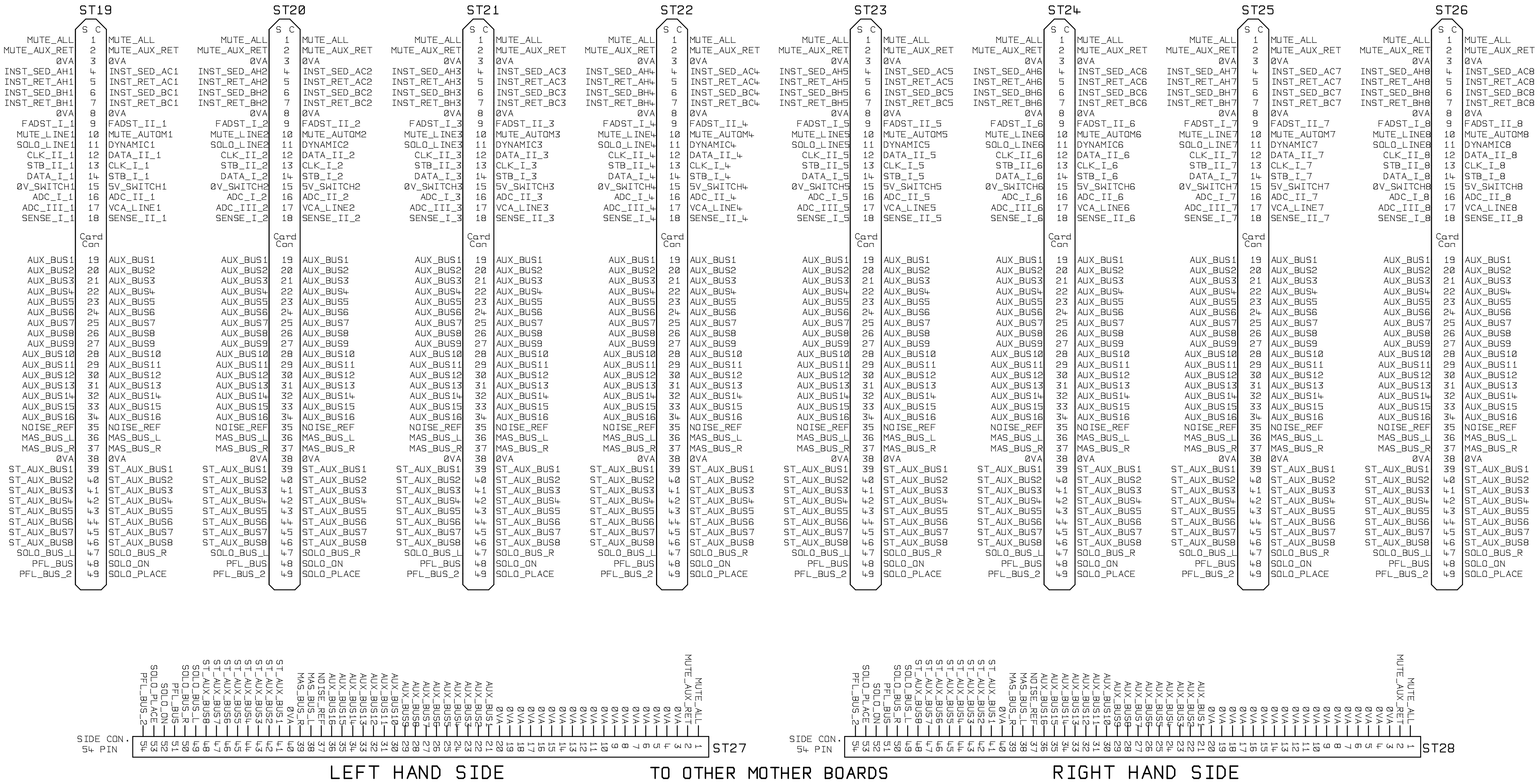
Drawn: T.K.G	Checked: A.C	UNIT XL4	MTX MOTHER/MASTER/COMMS.	3 OF 3
BOARD No. B2781 IS3		DWG No. XL4_MAS1.DGM	ISSUE: 3	DATE: 27.9.95


XL4
MIDAS AUDIO
MATRIX MOTHER



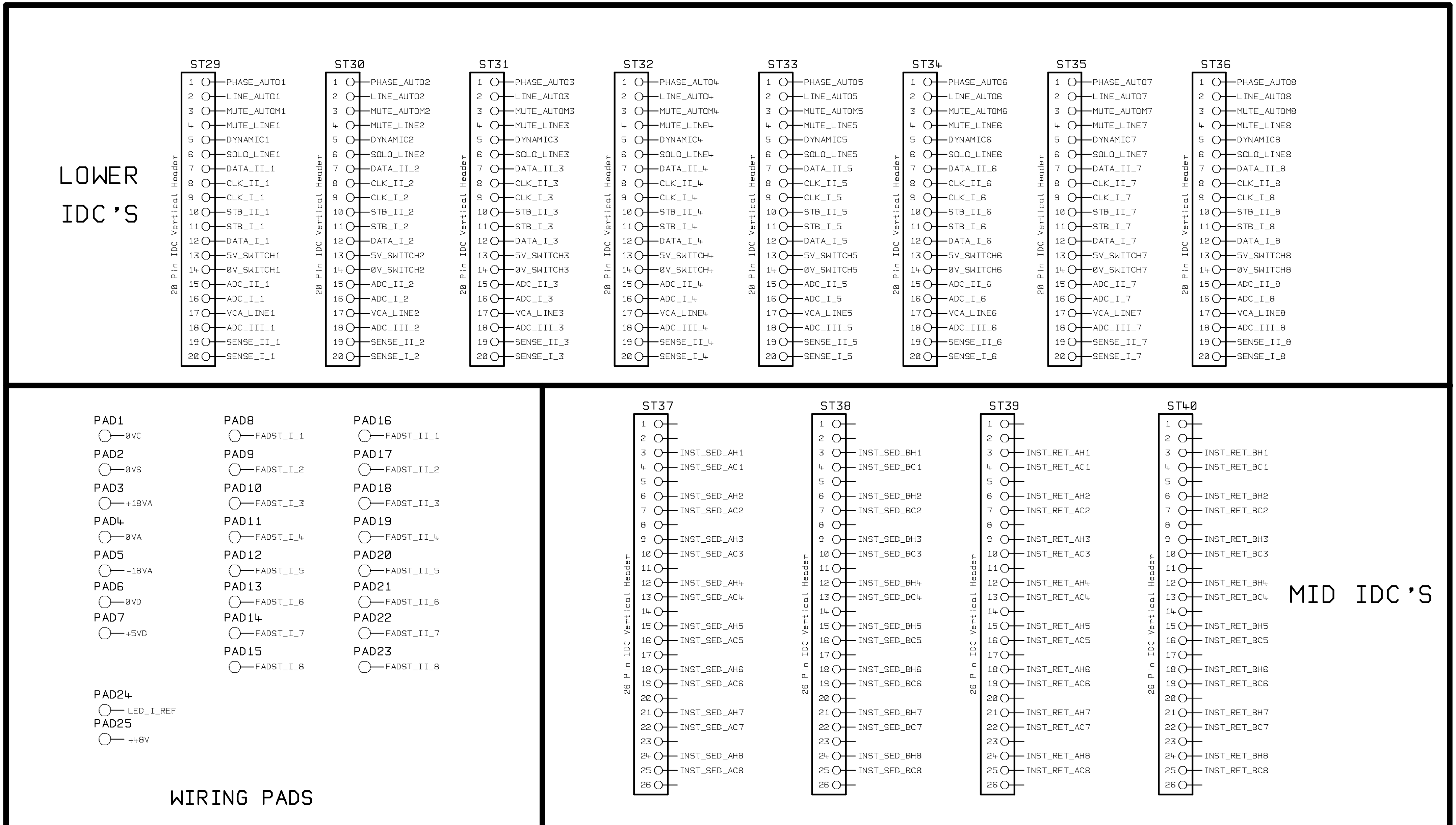
MIDAS AUDIO

Drawn: T.K.G	Checked: A.C	UNIT XL4	IP MOTHER UPPER CONNECTORS	1 OF 3
BOARD No. B2778 IS1		DWG No. XL4_IP1.DGM	ISSUE: 1	DATE: 15.2.95



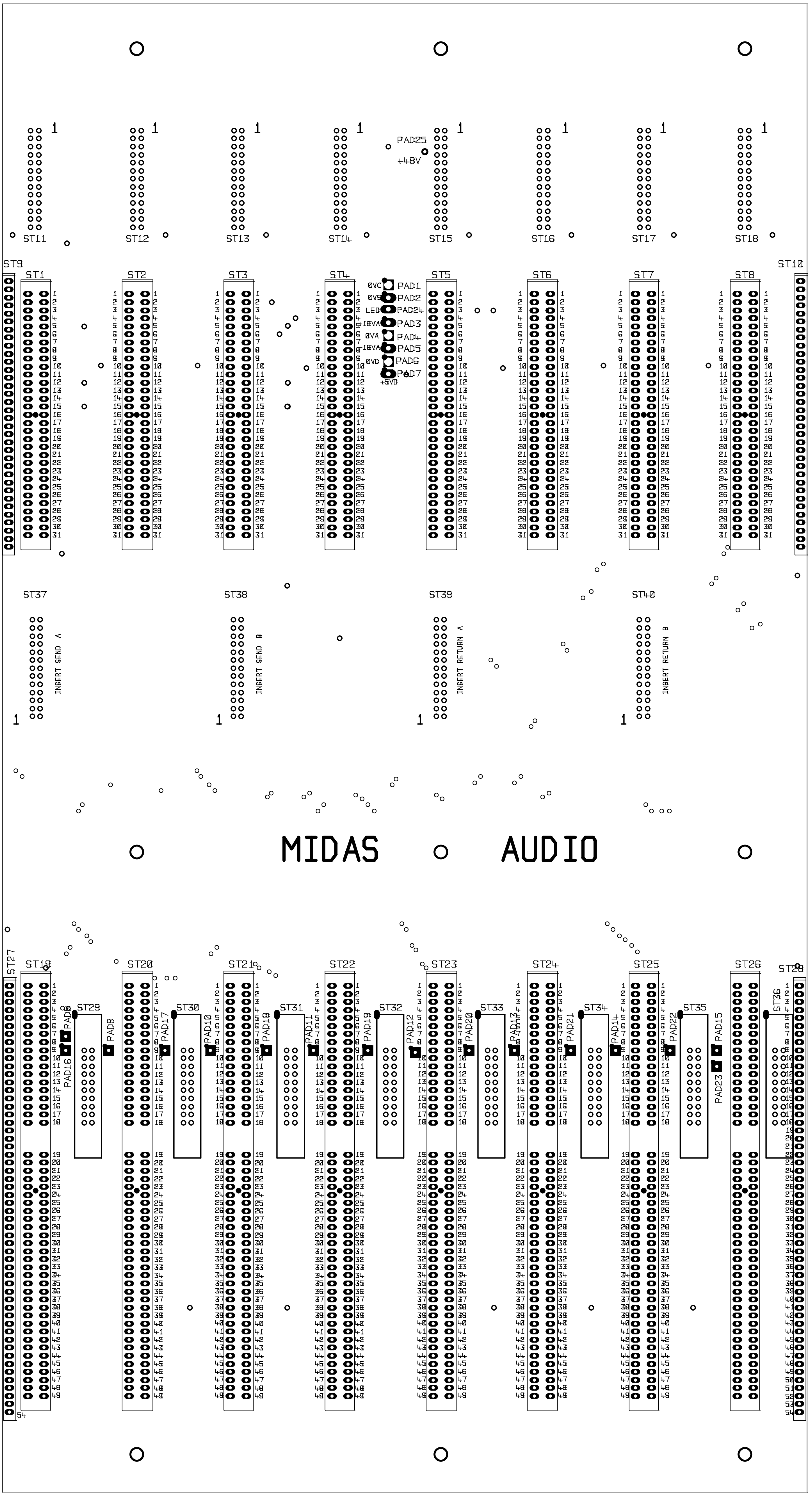
MIDAS AUDIO

Drawn: T.K.G	Checked: A.C	UNIT XL4	IP MOTHER LOWER CONNECTORS — 2 OF 3
BOARD No. B2778 IS1	DWG No. XL4_IP2.DGM	ISSUE: 1	DATE: 15.2.95

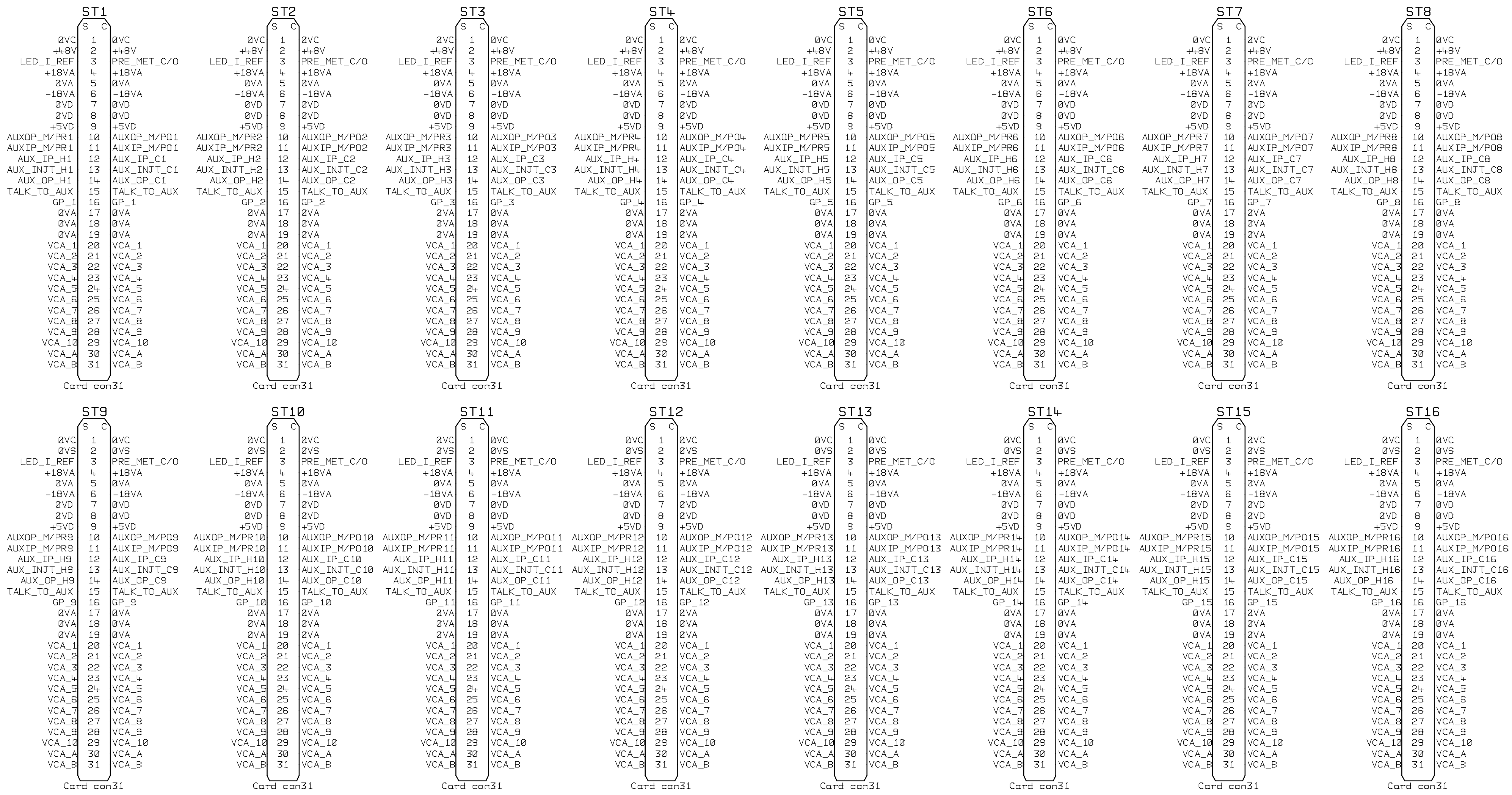


MIDAS AUDIO

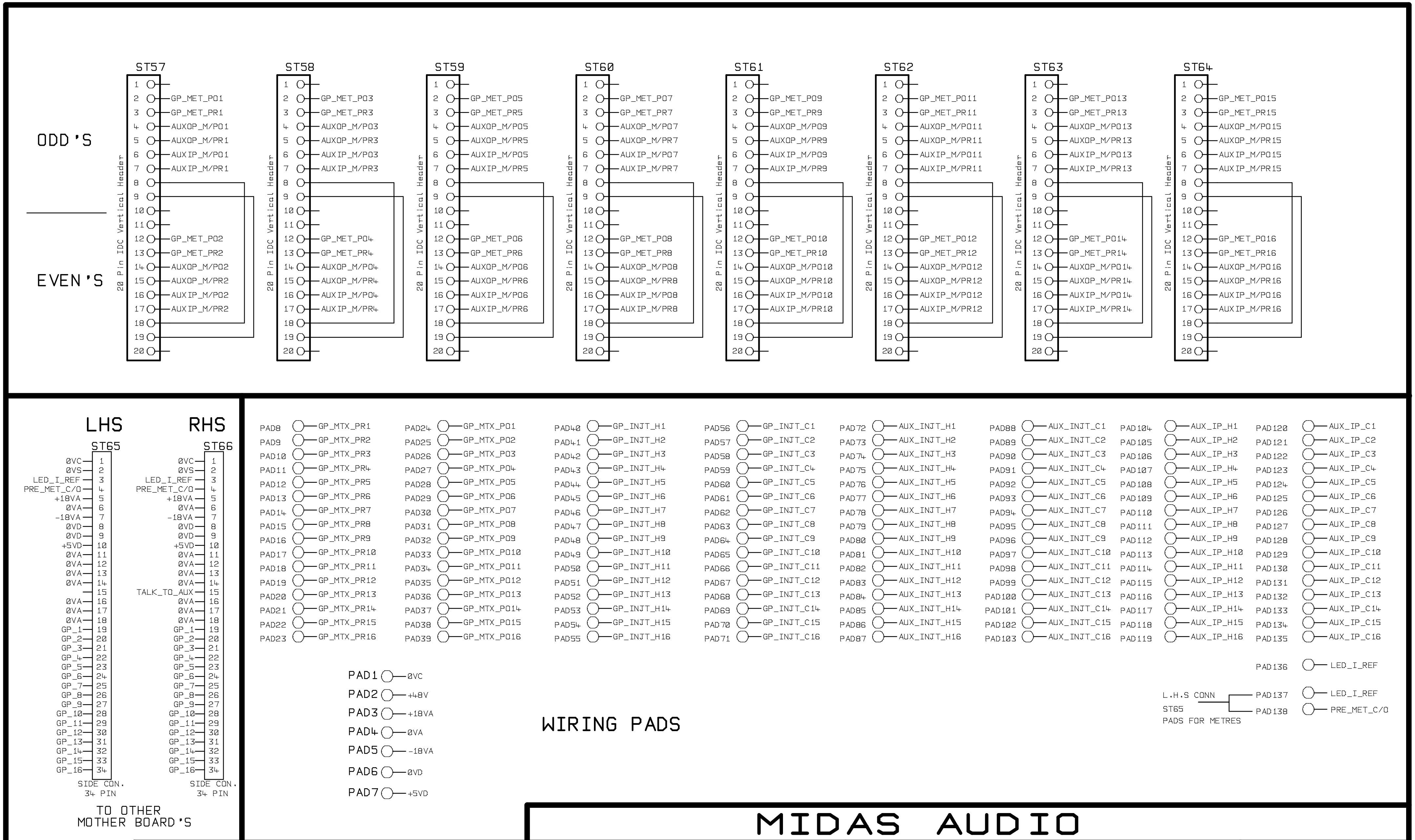
Drawn: T.K.G	Checked: A.C	UNIT XL4	IP MOTHER IDC CONECTORS
BOARD No. B2778 IS1	DWG No. XL4_IP3.DGM	ISSUE: 1	DATE: 15.2.95



MIDAS AUDIO
ST1 ST2 ST3 ST4 ST5 ST6 ST7 ST8 ST9 ST10
ST11 ST12 ST13 ST14 ST15 ST16 ST17 ST18
ST19 ST20 ST21 ST22 ST23 ST24 ST25 ST26 ST27 ST28
ST29 ST30 ST31 ST32 ST33 ST34 ST35 ST36
ST37 ST38 ST39 ST40
INSERT SEND A
INSERT SEND B
INSERT RETURN A
INSERT RETURN B
PAD25 +48V
0VC PAD1
0VS PAD2
LED PAD24
+18VA PAD3
0VA PAD4
-18VA PAD5
0VD PAD6
+5VD PAD7
PAD8 PAD9 PAD10 PAD11 PAD12 PAD13 PAD14 PAD15 PAD16 PAD17 PAD18 PAD19 PAD20 PAD21 PAD22 PAD23

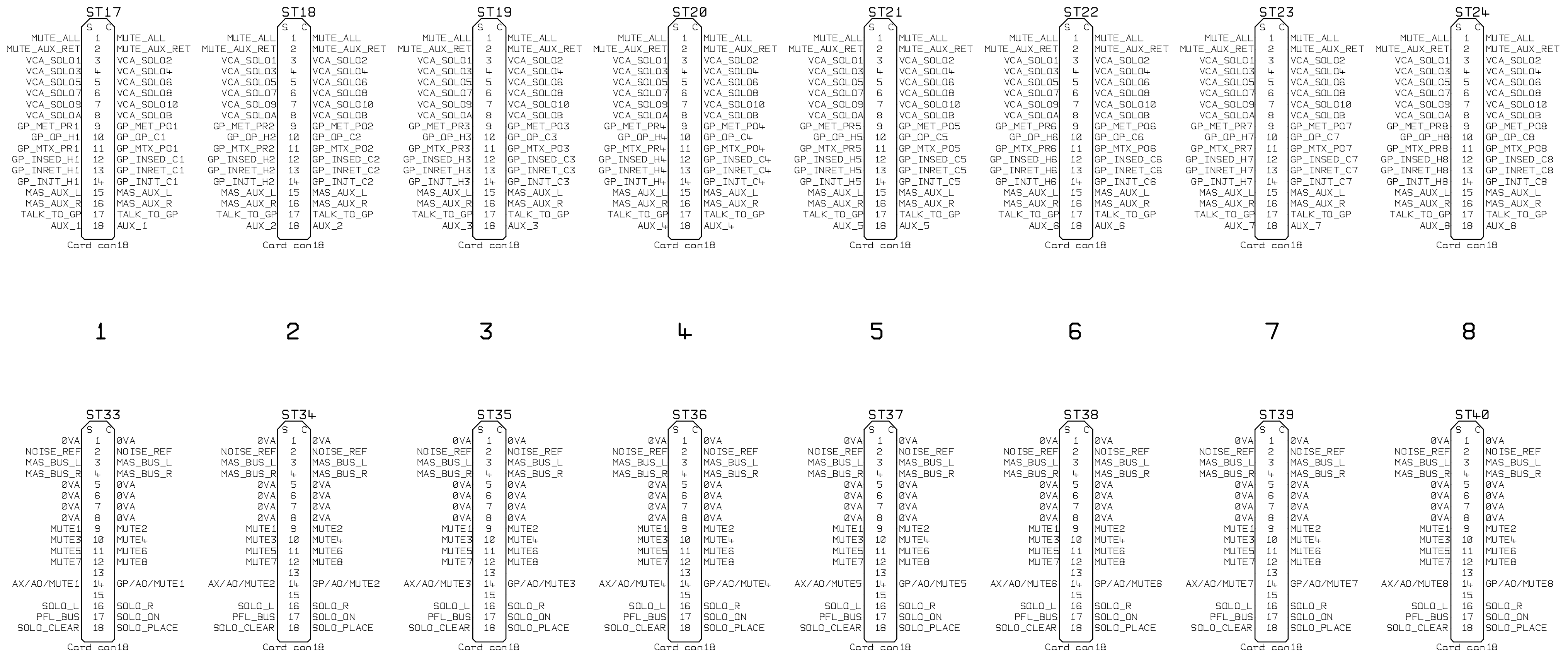


MIDAS AUDIO			
Drawn: T.K.G	Checked: A.C	UNIT XL4	GP MOTHER UPPER CONNECTORS	1 OF 5
BOARD No. B2780 IS2		DWG No. XL4_GP1.DGM	ISSUE: 1	DATE: 10.3.95



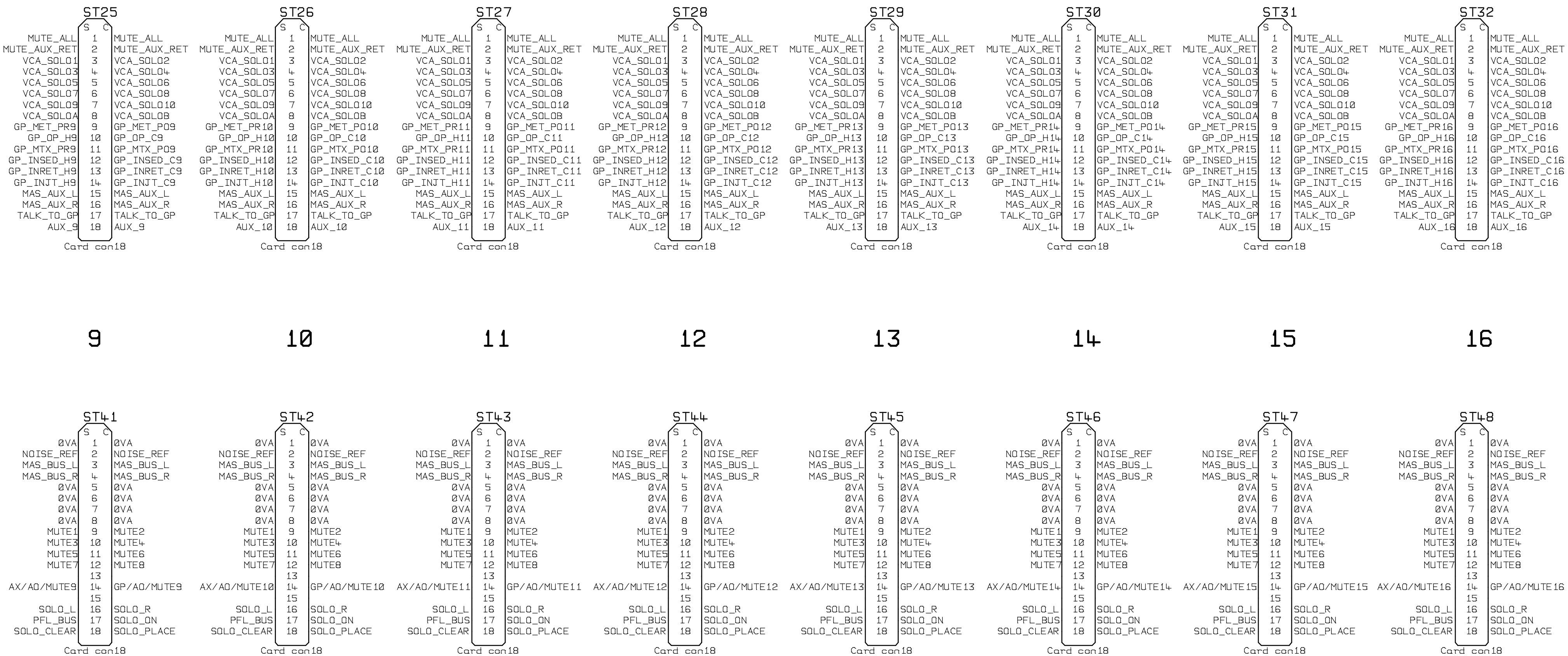
MIDAS AUDIO

Drawn: T.K.G	Checked: A.C	UNIT XL4	GP MOTHER UPPER CONNECTORS
BOARD No. B2780 IS2	DWG No. XL4_GP2.DGM	ISSUE: 1	DATE: 10.3.95



CARD CONNECTORS 1 TO 8

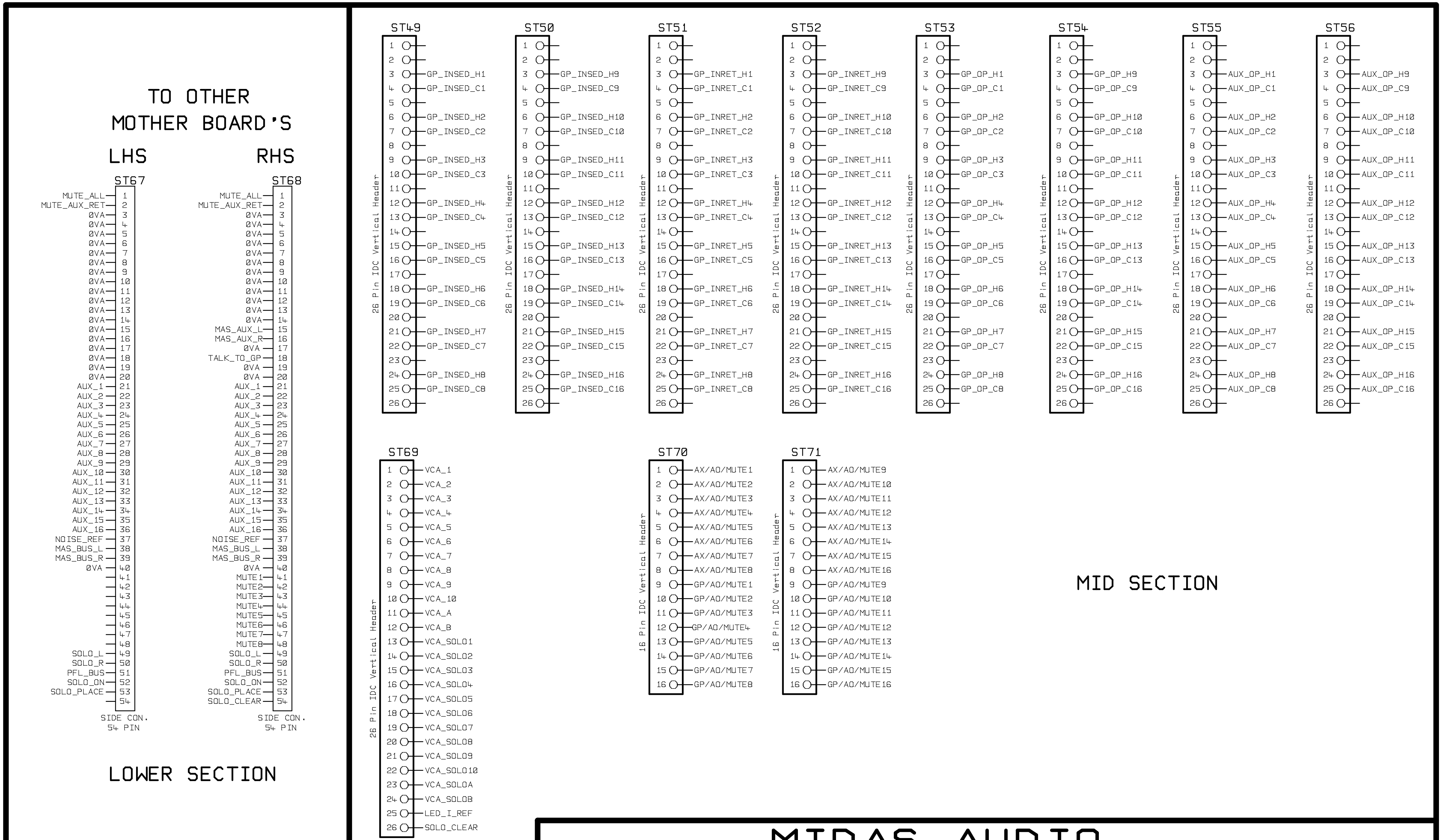
		MIDAS AUDIO		
Drawn: T.K.G	Checked: A.C	UNIT XL4	GP MOTHER LOWER CONNECTORS	3 OF 5
BOARD No. B2780 IS2		DWG No. XL4_GP3.DGM	ISSUE: 1	DATE: 10.3.95



CARD CONNECTORS 9 TO 16

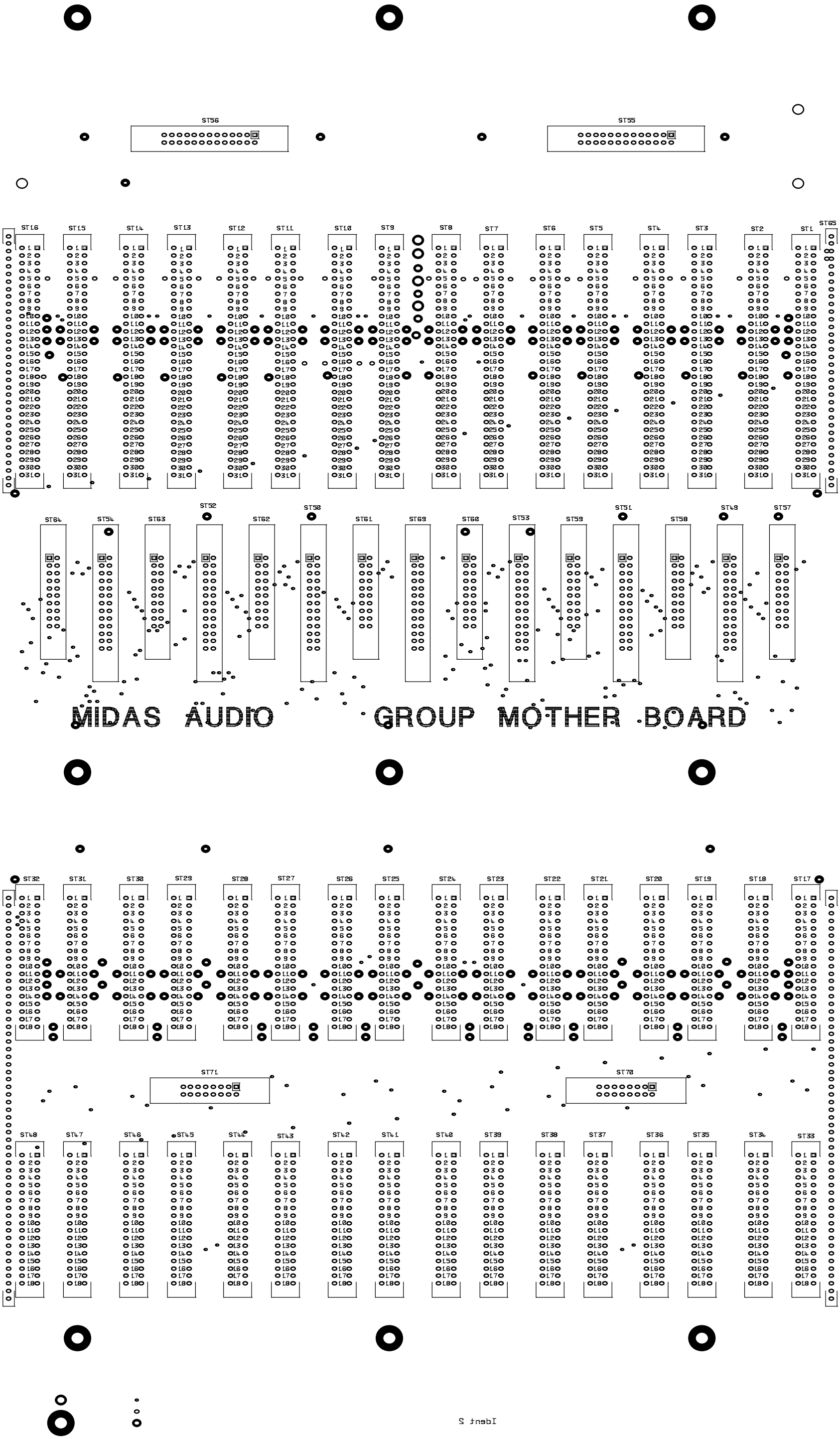
MIDAS AUDIO

Drawn: T.K.G	Checked: A.C	UNIT XL4	GP MOTHER LOWER CONNECTORS	4 OF 5
BOARD No. B2780 IS2		DWG No. XL4_GP4.DGM	ISSUE: 1	DATE: 10.3.95



MIDAS AUDIO

Drawn: T.K.G	Checked: A.C	UNIT XL4	GP MOTHER MID CONNECTORS
BOARD No. B2780 IS2	DWG No. XL4_GP5.DGM	ISSUE: 1	DATE: 10.3.95


MIDAS AUDIO GROUP MOTHER BOARD