# DCD2020
# Dante™ enabled Commentary Box

Firmware version 2.6

by

CTP Systems

## Product warranty

This unit is guaranteed for a period of one year from dispatch of the goods. This guarantee is a return to base warranty. In the unlikely event of a fault the goods should be returned to CTP Systems in the UK or your local dealer.

This equipment is CE marked and conforms to the following directives:

Low Voltage Directive: EN60065 and EN62368-1: 2014
Emissions: EN55032: 2015
Immunity: EN55035: 2017

WEEE

CTP Systems are registered for Business to Business sales of WEEE in the UK. Our registration number is WEE/DF0509VR. This is why our product has a ridiculous picture of a dustbin on the back.

RoHS

The product conforms to the RoHS Directive 2002/95/EC for restriction of the use of hazardous substances in electrical and electronic equipment.

This unit was designed and manufactured in the UK by CTP Systems Limited, Unit 4, Clinton Business Centre, Lodge Road, Staplehurst, Kent TN12 0QF. ctpsystems.co.uk. Telephone +44 (0)1580 891114

**Dante** is a trademark of Audinate Pty Ltd.

**This manual assumes a degree of familiarity with Dante controller. If you are not familiar please see this document:**

https://dev.audinate.com/GA/dante-controller/userguide/pdf/latest/AUD-MAN-DanteController-4.14.x-v1.1.pdf

## Firmware

The update from v1.0 to v2.0 adds local sidetone facilities to the DCD2020, the analogue inputs are now assignable to commentary box functions without a network connection and analogue input and output levels are now adjustable. The DCD2020 can now be effectively used as a fully analogue unit.

The currently installed firmware version is displayed on the LCD display on power up. Please contact us if you would like your firmware updated to the latest version.

## Overview

The DCD2020 is a Dante enabled Commentary box supporting 2+1 commentators. Network connection may be fibre or copper and it has full network redundancy. Microphone amplifier gains and many other adjustments such as phantom power and limit levels may be made on the local lockable LCD screen or remotely via the DCD2020's web pages.
In addition to the commentary box functions there is a built in Dante breakout box with six analogue inputs and eight analogue outputs. These inputs and outputs have level controls and may be assigned to commentary box functions with or without network connections, the DCD2020 may even be used as a standalone analogue unit. With 240V mains, 12 volt and PoE powering and a built in ethernet switch the DCD2020 can truly be the hub of your commentary system.

## Power

The DCD2020 may be powered by:

Mains, 110-240 VAC 50/60Hz.

Power over Ethernet (PoE) on either or both of the copper primary and secondary ethernet jacks. The unit has a class 3 signature.

An external 12 volt supply.

If the unit is powered using a mains supply, a 12 volt supply (minimum rating 1 Amp) may also be connected effectively providing a redundant supply for the unit. In fact power may be provided on all power inputs if required and the unit will seamlessly switch between supplies as required.

Clearly PoE power will not be available if the unit is used with fibre connections so the mains and/or the external 12 volt input should then be utilised.

## Network Connections

The DCD2020 has a built in network switch. This switch may be configured either as a standard switch where network connections may be passed on to other network devices or with redundant inputs for connection to a secondary (backup) network. The switch function should be configured from within Dante Controller.
For copper network connections the closest green LED will flicker on successful network connection. For SFP connections (usually fibre) the relevant green LED on the left of the sockets will flicker.

## Microphone Amplifiers

The DCD2020 includes three digitally controlled microphone amplifiers with very low distortion and really natural sounding audio amplification. Microphone amplifier gain is adjustable in 1dB steps from 0dB to +70dB.

Each microphone amplifier has an individual network output with a built in adjustable threshold limiter. There is also a selectable mixed output available with its own limiter. Ensure only terminated microphone inputs are switched to this output else the inevitable open mic line hiss will be heard.

All microphone inputs have switchable 48 volt phantom power, operation is indicated by red LEDs on the front of the unit.

Microphone inputs may be either 3 pin XLR or via the 5 pin headset XLRs.

## Talk Keys

When a talk key is pressed the programme output of the commentary microphone will be silently muted and the audio will be diverted to the relevant talk key(s) output. Commentators A and B have four talk keys, the guest has two talk keys. These talk keys may be individually routed via Dante Controller to any network destination. For simplicity and to avoid the need for mixing signals the talk keys are also available in groups. For example if all commentators are to talk to the Director on key 1 then just Talk A+B+G1 need be routed.
When a talk key is pressed the on air light will extinguish or change colour depending on settings. Gain make-up is available on the talkback outputs so they may be a higher level than the programme microphones.

## On-Air Keys

The On-Air keys may be programmed to off, where they will only operate as indicators, to momentary where when pressed they will take the commentators off air and when released back on air. (Useful, for example, as a cough key.) They may also be programmed to toggle so when pressed they will switch the commentator microphone off (and indicate as such) and when pressed again take the commentator back on air. If they are toggled off, the talk keys will still operate as normal but the commentator will not be switched back on air until the on-air key is toggled back on. Try it, it’s easier to see than to explain.

**GPI connections**

The DCD2020 includes three GPI inputs and three GPI outputs on the rear D15 connector. The three GPI outputs provide relay contacts which are shorted when the commentator is on-air and open when off-air. These only switch when the on-air keys are set to toggle mode and are intended primarily for external red on-air light switching.
The three GPI inputs activate the Talk1 key of each of the three commentators and are intended primarily for use with a foot switch or a remote key.

**Headphone Monitoring**

Each commentator has eight audio monitoring inputs with individual volume controls, the guest position has four volume controls. Sidetone may be achieved by routing the desired commentator to the desired volume control using Dante Controller. Every input may be switched via individual user adjustable mini toggle switches to left, right or both ears of the headphones.
Headphone monitoring connection may be 5 pin XLR with both microphone and headset connection or TRS jack stereo headset connection. This jack socket is suitable for use with both ¼ inch stereo and 316 (PO) jacks. Commentator and co-commentator sidetone may be assigned via the display or web page.

**Analogue Breakouts**

There are six analogue inputs and eight analogue outputs available via XLR on the rear of the unit, all accessible via the network. These breakouts have no fixed function and may be used for external or internal facilities as required. They may also be used to provide analogue inputs and outputs to/from the commentary box. For example, if commentator A microphone is required locally in analogue format just select it on the DCD2020 web page. Using the analogue breakouts it is possible to use the DCD2020 as an entirely analogue unit with no network connection

**Other Facilities**

The DCD2020 has a built in tone generator which can be set to identify the audio outputs, perfect for setup and identification of the audio channels with a different tone identification on each output. Lots of lights flash when it's on so it's not easy to forget. Commentator A output breaks once every three seconds. Commentator B outputs twice, Guest three times and the mixed output is continuous.

Tone frequency may be set at 400Hz, 1kHz or 2kHz to avoid confusion with other tone sources.

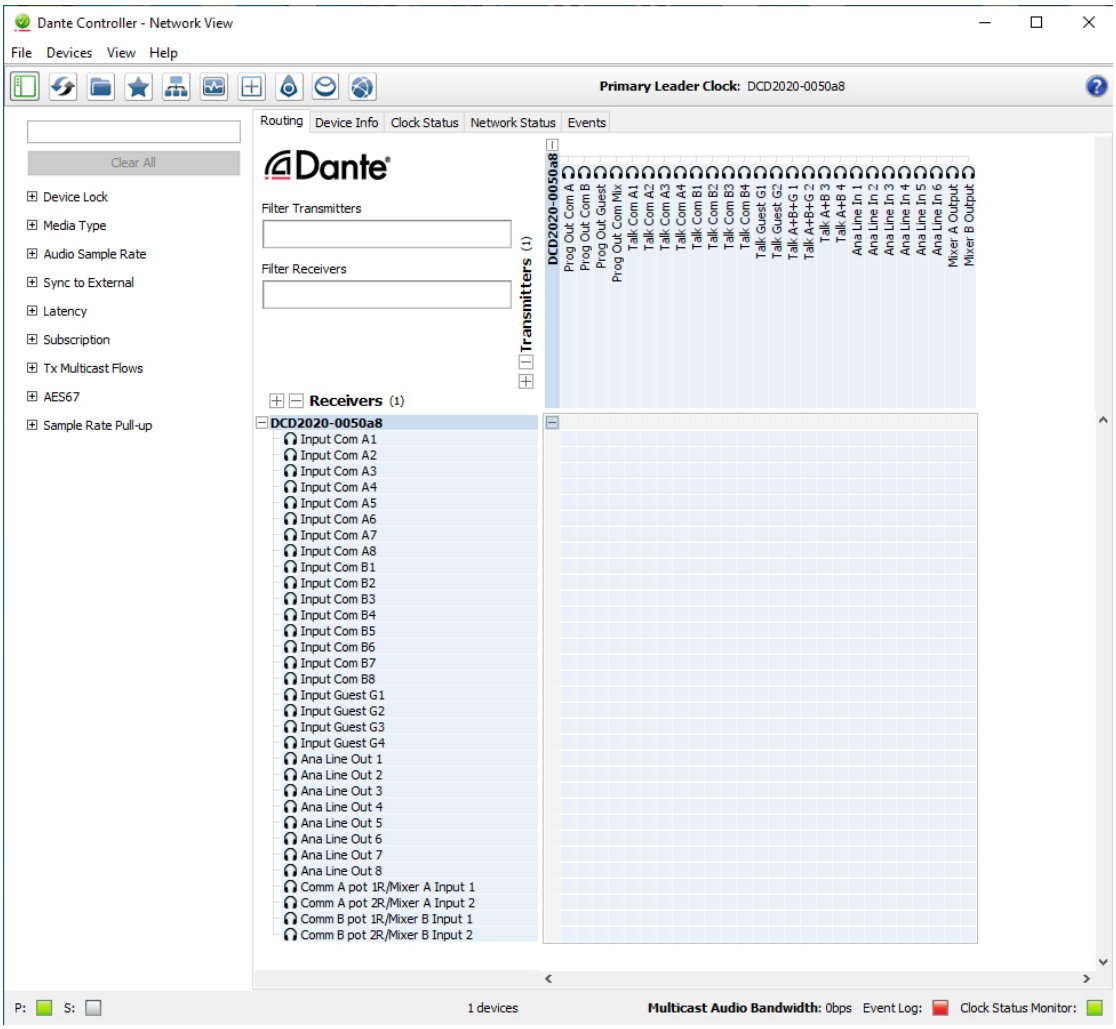
dBFS metering is available for all three commentators and the mixed output and is the default function of the LCD screen

The system includes two 2:1 Dante mixers for convenient adding of Dante audio signals.

The LDC display and its functions may be locked using the toggle switch on the rear to prevent accidental ‘adjustments’. When locked the display will just show microphone levels on the dBFS meter.

## Using with Dante Controller

Below is a picture of how the DCD2020 will appear in Dante Controller and a brief description of the functions.




## Dante Transmitters

| | |
|---|---|
| Prog Out Com A, B and G : | These are the Programme microphone outputs which remain active unless a talk key is pressed or on-air is disabled using the on air keys. |
| Prog Out Com Mix : | A mix of all the selected programme outputs. |
| Talk Com A1 to Guest G2 : | Talk or ‘Lazy’ outputs, individual to each key. |
| Talk A+B+G1 to A+B4 : | Mix of keys sent to selected destination. |

| | |
|---|---|
| Ana Line In 1 to 6 : | Rear analogue inputs to Dante network |
| Mixer A Output : | Dante general purpose mixer A output |
| Mixer B Output : | Dante general purpose mixer B output. |

**Dante Receivers**

| | |
|---|---|
| Input Com A1 to A8 : | Inputs to commentator A volume controls. |
| Input Com B1 to B8 : | Inputs to commentator B volume controls. |
| Input Guest G1 to G4 : | Inputs to Guest volume controls. |
| Ana Line Out 1 to 4 : | Rear analogue outputs from Dante Network. |
| Mixer A inputs 1 to 2 :<br>CommA pot | Dante general purpose mixer A Inputs.<br>These double as Comm A stereo pot right inputs |
| Mixer B inputs 1 to 2 :<br>CommB pot | Dante general purpose mixer B Inputs.<br>These double as Comm B stereo pot right inputs. |

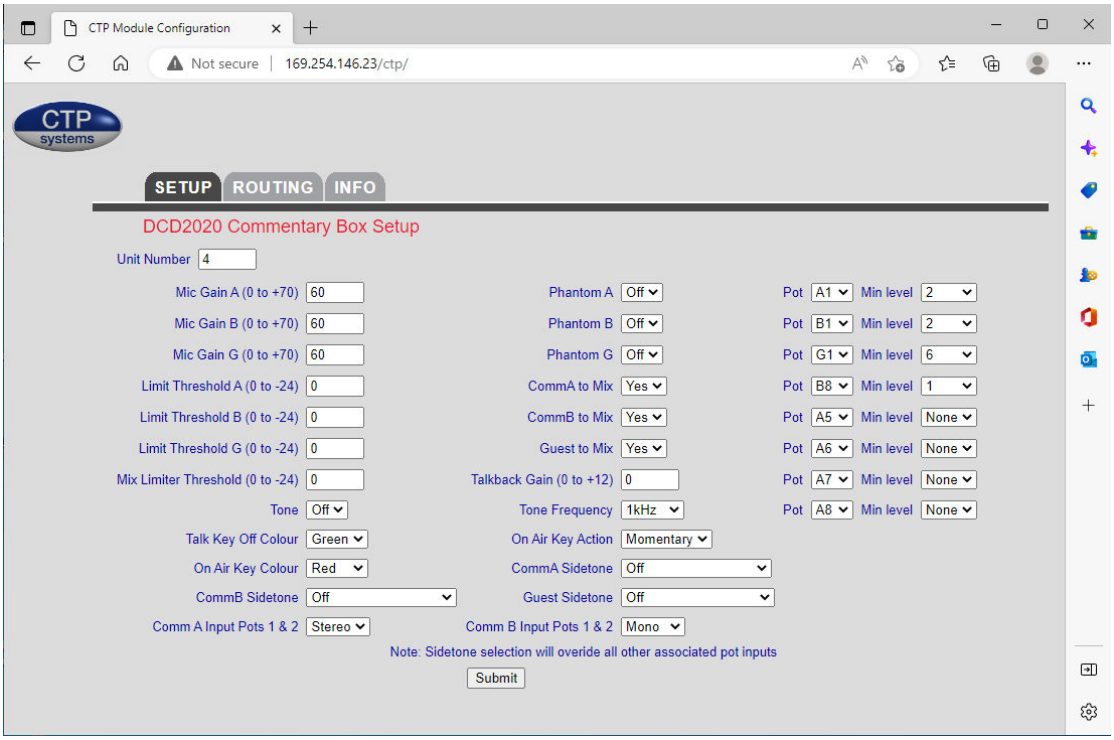
**Accessing the DCD2020 web page**

The Dante web page may be accessed using the Dante assigned IP address of the DCD2020. If you are using a fixed IP address then you already know what the IP address is. If you are using DHCP the address may be found using Dante Controller and selecting Device Info. Dial this address (ie. 169.254.34.217) into your web browser and the webpage will appear.
If your network is suitably set up it is also possible to access the web page using the following:

http://dantename.local/

where dantename is the name that appears for the DCD2020 in Dante Controller. If this does not work it is outside the scope of this document and down to your network setup, please ask your IT dept.or use the IP address.

Any number of DCD2020s may be viewed at once in multiple browsers or tabs. If changes are made using the LCD screen the web page will not be automatically updated, it must be refreshed in the normal way as with any web page. Once downloaded the information is static until reloaded. For this reason, if the unit is to be adjusted both at the commentary box end and via the web page it is recommended to refresh the web page before making adjustments via the web interface.




For items on the web page with a down arrow such as Phantom A, just click on the down arrow and select as required. For items with a direct input such as mic gain just click on the box and type in a value. Any values outside the allowed value range will result in no change in the display, the allowed range is shown to the left of the input boxes. Note that one or any number of changes may be made but they will not be sent to the commentary box until the ‘Submit’ button is pressed.

If at any time you require confirmation of the comms box status just put the cursor in the URL box and hit return and the page will reload.
When inputting positive values (say +12dB) the + sign is not required so just type in 12. For negative values the minus (-) is required as in standard mathematical notation. Note that gain is relative, as in +60dB but limit thresholds are fixed as in -18dBFS.

**Comms box setup**

All of the following setup functions are available using the LCD display or the DCD2020 web page. The guide shows how to access the functions using the LCD while they are all available directly on the web page. Please note again the need to refresh the web page if changes are made using the LCD display. All changes on the LCD screen are shown live, if the LCD screen is showing mic gains and the web page changes these values the changes will immediately appear on the LCD screen.
Don't forget to press 'submit' on the web page!

LCD adjustment of settings may be protected by switching the rear panel toggle switch to 'lock'. When switched to' lock' the display will automatically switch to the top menu showing 'Setup locked' and the four dBFS meters. No adjustment will now be possible from the LCD buttons but all functions are still adjustable via the web page.

Setup
From the 'switch on' menu select 'Setup'

Mic Gains
This allows adjustment of individual microphone amplifier gains from 0dB to +70dB. Press the button next to the mic amp you wish to adjust. The cursor arrows will move to show your selection. Press the up/down buttons to adjust to the required gain. Either press the button quickly to adjust in 1dB steps or hold the button down to adjust at speed. Press 'back' to return to the top menu.

Phantom
Each mic amp is shown with phantom on or off. Press the associated button to toggle phantom on that channel on or off. Front panel LEDs will illuminate to indicate status with phantom on.

Limiters
Each microphone amplifier has it's own limiter. To adjust the limit threshold select the required microphone to adjust, the cursor will move to show the selection. Press up or down to adjust the threshold to suit. If no limiter is required in circuit then adjust the limiter to it's maximum threshold of 0dBFS

Mixed O/P
This allows selection of each microphone to the mixed output. It is important that if a mic amp is not in use that it is deselected from the mixed output as otherwise the inevitable 'open mic amp' hiss will be added to the mix.

Back
This returns to the previous menu.

More
This selects the More menu as below.

**More menu**

Mix limiter
This is used to set the limiter threshold for the mixed programme output. This limiter is inserted after the individual commentator limiters and is available to limit the overall mix. If not required just set the threshold to 0dBFS.

Tone Gen
This generates tone with interrupt identification on each line at -18dBFS.
Idents as follows:

| | |
|---|---|
| Commentator A : | 1 break every 3 seconds |
| Commentator B : | 2 breaks every 3 seconds |
| Guest : | 3 breaks every 3 seconds |
| Mix: | Continuous tone. |

When Tone Gen is selected the comms box is effectively disabled apart from tone generation.
To signal this all the lazy keys will flash alternate red and green. Just press 'Off and back' to return to normal operation.
Each output may be selected to tone on or tone off. Frequency may be changed between 1kHz, 2kHz and 400Hz to enable differentiation from other tone sources.

TB Setup

Gain

Gain may be adjusted up or down on the talkback output circuits. Useful for sports such as snooker where the commentary may be quiet but a higher level may be useful for the talkback outputs. Gain range is 0 to+12dB.

Key Off Colour

The ten lazy keys may be green for off and red for active or clear for off and red for active.

Mic Live keys

The mic live A, B and Guest keys may be used as just ‘on air’ indicators, or as momentary or latching ‘cough’ keys where pressing the relevant button will take the commentator off air (muted mic amp). When selected to off the keys will do nothing apart from indicating off air when a lazy key is pressed. Momentary will take the commentator off air only while the key is pressed. Latching will switch off air and remain off air until the key is pressed again. Latching mode also enables the GPI relays.

TX Light Colour

The TX switch lights (Mic Live A, B and Guest) may be selected to be green when the mic is live and red when not live OR red when the mic is live and off when not live. Press the TX Light colour button to toggle between the two selections.

More

This navigates to the second set of menus as below.

Back

This returns to the previous menu.

**Second More menu**

Sidetone

Sidetone (or commentators hearing themselves) may be assigned in several combinations. This is an example for commentator A.

| | |
|---|---|
| Off: | No sidetone, all ‘pot’ inputs are Dante assigned. |
| Self A3, Co-comm A4 | Pot A3 = comm A voice, Pot A4 comms B and G. |
| All A4 | Pot A4 = All commentators voices. |
| Self A7, Co-comm A8 | Pot A7 = comm A voice, Pot A8 comms B and G. |
| All A8 | Pot A8 = All commentators voices. |

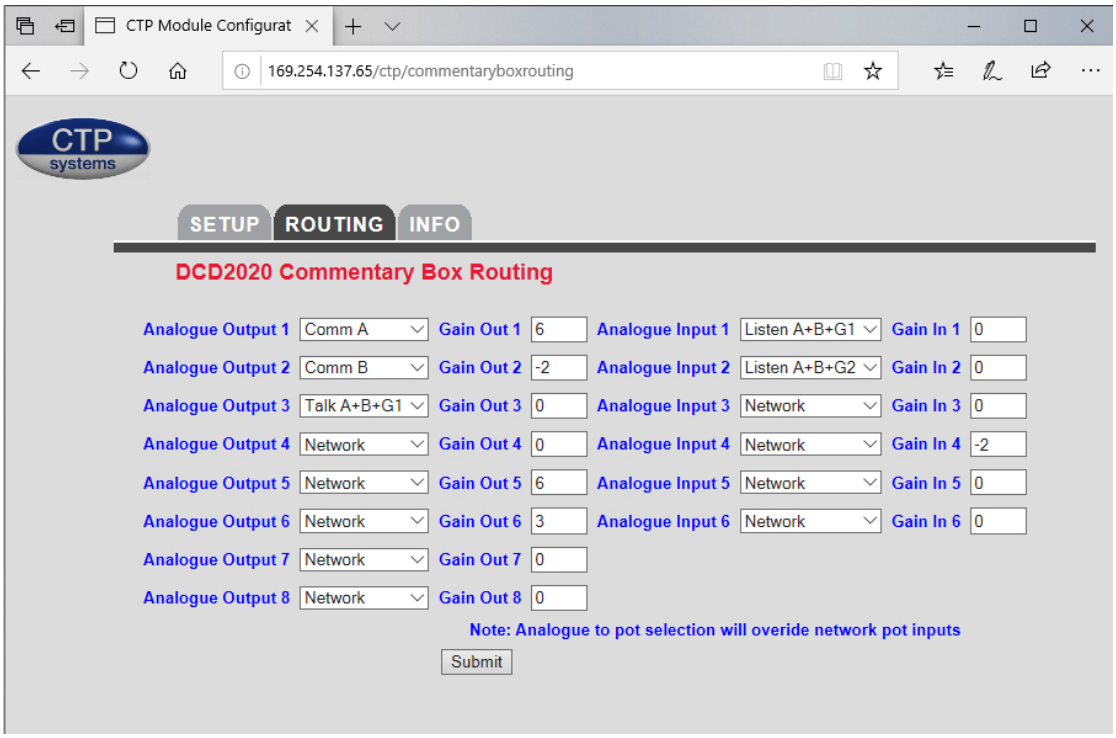
When a potentiometer is assigned to sidetone its associated Dante input is no longer available.

Analogue I/O

This enables assignment and level control of all analogue inputs and outputs. This is also available on the second tab of the web server as shown below.

For setting up on the DCD2020 screen press the top left button to navigate to the analogue input or output you wish to adjust. Repeat pressing of the button will loop through all the inputs and outputs.

When the required I/O is on the screen its assignment will be shown underneath and the level setting on the right. To change assignment press the button next to the assignment to scroll through as required and to set the level press gain+ or gain-. +-12dB of gain is available. Settings will be memorized as they are adjusted so just press Back to exit. These settings are more easily adjusted using the web page.




These settings are independent of the Dante or AES67 network so may be setup to use the DCD2020 as an analogue commentary box. All outputs will still be routed to the Dante outputs if selected to analogue so these may be used as ‘safety’ feeds in case of network problems. Losing the network will not affect the assigned analogue outputs. In the case of analogue inputs, selecting a pot, say A+B+G4 (pot 4 of all commentators) will override any network inputs to that pot. In the same way selecting sidetone will override any network or analogue inputs to that pot.

Set all inputs and outputs to Network for normal Dante or AES67 operation.

Contrast
Press contrast+ or contrast- to adjust the contrast of the DCD2020 screen.

Stereo Inputs
Commentator A pots 1 and 2 may both be switched to stereo operation as may commentator B pots 1 and 2. Just select stereo or mono from the 'Comm nnn Input pots 1 & 2' dropdown boxes. When selected to stereo the pots normal input now becomes that pots left input. The relevant Dante mixer input then forms the pot's

right input. If a commentator's pots are switched to stereo, then the two mixer inputs are no longer available. Stereo input selection may also be switched on the LCD screen. From the top menu select 'Setup', then 'more' then 'more' then Mono/Stereo.
Press the left hand button to toggle between stereo and mono inputs.

Pots minimum Level
Up to eight pots may be selected to operate with a minimum level, preventing them from being completely turned down. These may be any of the twenty pots on the unit.

Just select the pot number (A! through to G4) from the pulldown menu. Then select your chosen minimum level. 'None' means the pot will not have a minimum level and will turn down as normal. 1 is the lowest minimum level while 10 is the highest.

If the same pot is entered twice then only the first entry will be actioned.

Minimum level may also be setup on the LCD screen. From the top menu select 'Setup' then 'More' then 'More' then 'Minvol'. The line between the > < arrows is the line being adjusted. Use the up/down arrow keys to select a different line.
Use the <> keys to highlight a setting to be adjusted. Use the + - keys to adjust the values.

Back
This returns to the previous menu.

**Utility D15 Pinouts**

Pins 1 and 9 short when Comm A on air
Pins 2 and 10 short when Comm B on air
Pins 3 and 11 short when Guest on air

Short Pins 4 and 12 to activate Talk A1
Short Pins 5 and 13 to activate Talk B1
Short Pins 6 and 14 to activate Talk G1

**Headset XLR**

1 Headset mic live
1 Headset mic neutral
1 Headset Earth
4 Right earpiece live
5 Left earpiece live

**Sample rate**

The DCD2020 is set to operate at a sample rate of 48kHz, 24 bit.