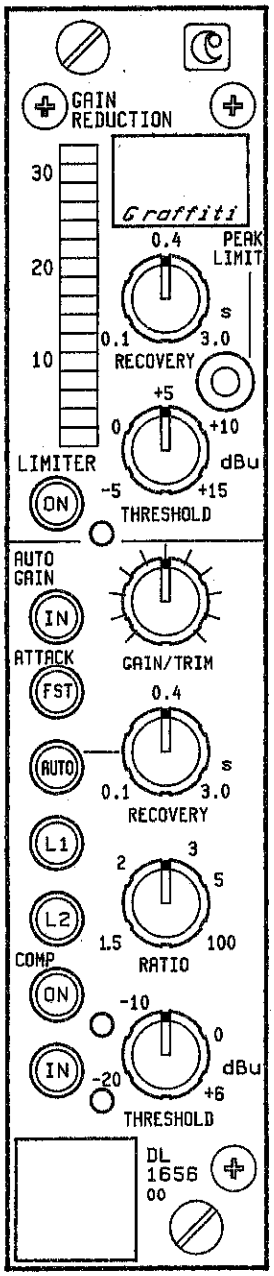


CALREC AUDIO LIMITED

HANGINGROYD LANE, HEBDEN BRIDGE, YORKSHIRE, ENGLAND, HX7 7DD
TELEPHONE 0422 84 2159 / 2119 HEBDEN BRIDGE
TELEX 51311 ANSWER BACK RELAYS G ATTENTION CALREC

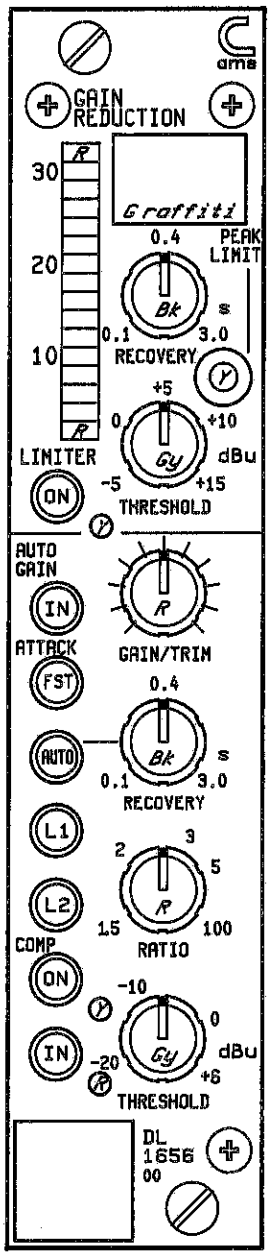
"GAIN REDUCTION"
-9.5:1 COND.

BARGRAPH SCALE
9.5:1 COND.

D-STAT BUTTON
ORIENTATION

2 LETTS
GRANBY LIGHT
8 POINT

4 LETTS
GRANBY LIGHT
8 POINT COND.



IDENT No-11:1
SERIAL No-15:1

12:1

SELF CLINCH STUD
M3x19 350-076

GRAFFITI
659-051-1A4

RADIAL DIVS-15PCD
27deg INCREMENTS
270 deg INDEX

ALL PANEL TEXT
12:1 COND. EXCEPT
WHERE STATED

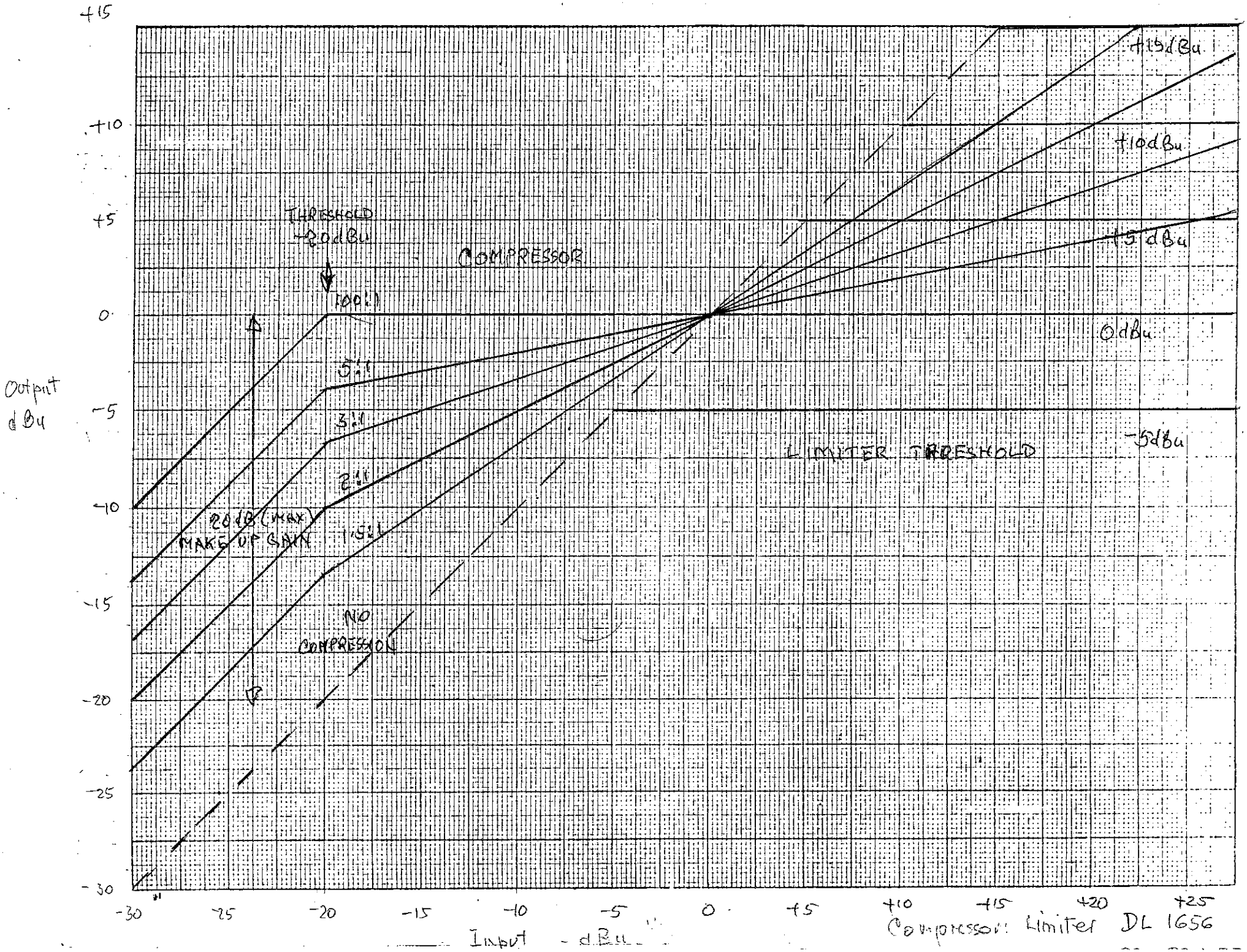
WORKS ORDER.
LIST.....
ITEM.....
QUANTITY....
JOB NUMBER..

MECH. DWG 603-002-1A2

TITLE DL1656 COMPRESSOR/LIMITER PANEL ENGRAVING DETAIL	DRAWN	DATE	APP'D	ISSUE DATE
	P.Dubo	6/5/85		20.1.89

CALREC AUDIO LIMITED
BILLINGTON ROAD BURNLEY
BB11 5ES TELE 0282 57011

1656-1-2A4



Compressor Limiter DL 1656

COMPRESSOR LIMITER TYPE DL1656

The DL1656 consists of a combined compressor and limiter. Two VCA's are controlled by separate compressor and limiter side chains, only one VCA being in the direct signal path. The two sections may be used independently or together in which case the compressor is effectively before the limiter.

The compressor section has facilities for fast and slow attack times but the actual time is a function of the signal being processed. Recovery is also complex but is generally variable between 0.1 and 3.0 seconds or as a two part auto recovery.

Compression ratio is variable between 1.5 and 100 to 1. The compressor side chain is configured in such a manner as to allow the complex attack and delay characteristics and give a low distortion performance. Also it allows overshoot of up to 4dB on some sounds in order to give a 'brighter' sound to some compressed music. Thus in its limiting mode (100:1) it is intended for special effects rather than for use as a conventional peak limiter.

Another feature of the compressor section is the provision of optional automatic make-up gain. With the 'Gain/Trim' control set centrally and at any setting of the 'threshold' control below 0dBu also at any setting of the 'Ratio' control sufficient make up gain (subject to a maximum of 20dB) is applied such that with an input signal of 0dBu the gain of the compressor is zero. This make up gain can be increased or reduced by 10dB by the 'Gain/Trim' control but no more can be taken off than the auto make up gain puts on.

With the auto gain switched out and the 'Gain/Trim' control fully anti-clockwise no gain is applied. Rotating this control clockwise applies up to 20dB gain manually.

The 'Threshold' control is calibrated from -20dBu to +6dBu and determines the level at which the compressor starts to operate. It refers to the signal level at the input to the whole unit.

The limiter section is connected so as to operate effectively on the compressor output. It is equipped with signal dependent attack and recovery characteristics in order to keep distortion to a minimum but does not have the 4dB overshoot present in the compressor, it can therefore be used as a conventional limiter. Later models have a recovery control with a range of 0.1 to 3.0 secs tending towards auto (2 part) operation at high settings.

The threshold control is calibrated from -5 to +15dBu and effectively sets the maximum output level. A single LED indicates operation of the limiter.

Gain reduction up to 32dB is shown on a LED type bargraph, the combined reduction by both compressor and limiter being indicated. Make up gain is not shown. Indications are still displayed according to the settings of controls when the 'in/out' switch is out.

Two link buttons are provided to enable two bus bar systems to be used to link the side chains. Compressor and limiter are linked but not the make up gain.

The unit is provided with balanced electronic input circuitry and a balanced, floating transformer output. The in/out button provides a "straight through" signal path in the out position.

Line up level 0dBu

Input	-	impedance approx. 20k ohm
	-	max signal level - better than +30dBu
Output	-	max signal level - +26dBu in 600 ohms
Supply	-	± 15 volts at ± 150 mA approx
	-	+8 volts at up to 200 mA

CB 22.1.87

CALREC AUDIO LIMITED

Compressor Limiter - Type DL 1656

Alignment Instructions.

Set all presets to centre.

1. Set CMR of i/p (pins 9 and 10), check at output (pins 29 and 30) with 'IN' button in and all others out Adjust RV1 and CV1.

2. Set 10v Ref. at TP4 - Adjust RV 16.

3. Set distortion of main VCA with RV2 check at o/p.

4. Set distortion of Aux VCA with RV3 check at TP1.

5. Set controls - IN button in, all other buttons out.
   Threshold controls clockwise and all other controls anti-clockwise.

6. Feed in a 1KHz tone at 0dB, check that the o/p is at the same level. If this is not the case, first check that there is 0v on the pins of A11a and A11b. If this is not so then this fault must be corrected first. If the o/p is still not correct, adjust R18 to give correct output. Check frequency response.

7. Select red 'IN' button and limiter 'ON', feeding 1KHZ at 0dB set RV6 so that limiter does not reduce output after limiting.
   Set threshold to -5, i/p to +15dB, set RV5 for -3dB o/p*.

8. Set threshold to 15dB, i/p to +20, o/p should be +17dB*; adjust RV5 if necessary and re-check threshold at -5. Repeat for optimum adjustment. Set peak limit light just to illuminate at onset of limiting with RV8.

9. Obtain 30dB less o/p than i/p and set RV9 so that 30 led just lights, check attack and recovery times (Recovery Auto with pot fully clockwise).

10. Deselect limiter and select compressor, set ratio to 100/1 and adjust RV12 for optimum compression i.e. 0.1dB increase in o/p for 10dB increase in I/P.

11. Adjust RV11 so that compression occurs at the correct threshold as per limiter i.e. - 18dB o/p with thresh @-20 and '0' input*. Check frequency response.

12. Set threshold to odB and i/p to odB - Note that turning the gain/trim fully clockwise increases o/p level to +20dB (± 1dB).

13. Check ratio, attack and recovery. (i.e. Increase i/p by 10dB with ratio set to 5 o/p should increase by 2dB).

14. Set i/p to 0dB.
    Set gain trim to centre and select auto gain - Note that the o/p stays approx constant at odB for any threshold or ratio setting also with the gain trim clockwise the o/p goes up by 10dB and with trim anti-clockwise the o/p goes down by 10dB , except that it cannot subtract more gain than the auto gain puts on.

15. Check pin 1 and 2 for side chain voltage when link buttons are pressed (L1, L2).

* NOTE: TO COMPENSATE FOR THERMAL DRIFT

A.T. 6.8.87