

General:

Supply voltage	: 220/110V AC 50Hz
Current consumption	: approx. 80mA.
Input impedance, balanced floating	: 10 kOhms $\pm 10\%$
Input common mode rejection ratio	: > 60 dB
Input overload level	: +21 dBu
Output impedance, balanced floating	: less than 40 Ohms, typ 30 Ohms
Min. load impedance	: 300 Ohms (Uout max. = +19 dBu)
Output overload level at $f \geq 30\text{Hz}$	: +21 dBu ( $R_L > 1\text{ kOhm}$ )
" " " " $f = 15\text{Hz}$	: +15 dBu
Basic gain, adjustable	: 0 to +12 dB
Frequency range (0.3 dB points)	: 40 Hz to 15 kHz
Distortion (40 Hz to 15 kHz)	: less than 0.1% THD (Gain < 15dB, Uout < +15dBu)
Output noise (0dB gain)	: -89 dBu rms 20 Hz to 22 kHz (See Note 1) -78 dBu psh. Peak (CCIR-468-1)

Compressor section:

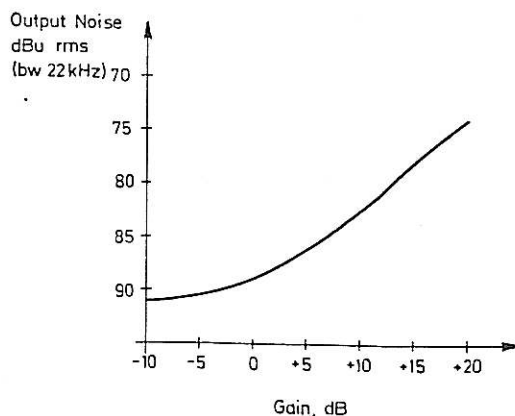
Ref. level, adjustable	: -8 dBu to +15 dBu
Max. gain/attenuation below threshold, adjustable	: 0 to 20 dB
Compression ratio, adjustable	: 1.3:1 to 20:1
Expansion ratio, adjustable	: 1.25 to 1:1.9
Attack time, adjustable	: 0.1 ms to 100 ms
Recovery time, adjustable	: 0.1s to 6s
Auto position, dual time constants	: programme dependant
Recovery delay	: programme controlled, frequency dependant.
Recovery hold level, adjustable	: 10 dB to 50 dB below actual operating level
Control voltage, output/input	: 1 V per 5 dB; Maximum number of compressors connected in a group=10

Limiter section:

Lim. threshold level adjustable	: 0 dBu to +15 dBu output level
Peak limitation level	: 3 dB above threshold level (at 10dB lim.)
Attack time	: 1.5ms combined with clipping circuit
Recovery time	: 0.5 s per 10dB

Gate, section

Threshold level, adjustable	: 0 dBu to -50 dBu input level
Gate attenuation, adjustable	: 0 dB to 20 dB
Expansion ratio	: 1 : 2
Attack time (for increasing input level)	: approx. 1 ms
Recovery time (for decreasing input level)	: selectable 20 ms, 100 ms, 500 ms.

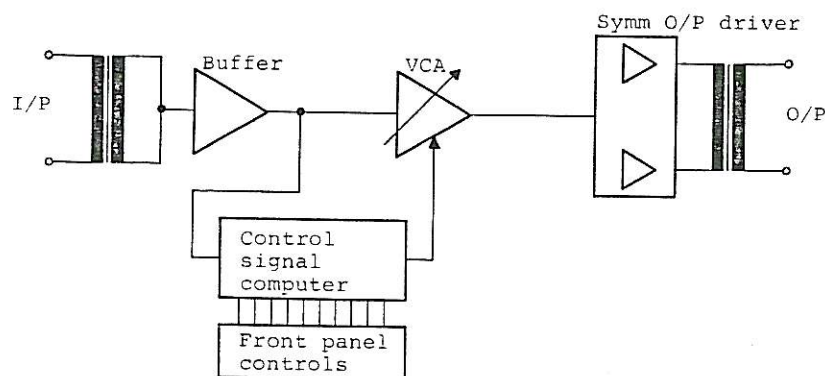


The NTP Compressor 179-170 consists of two identical compressors and an AC power supply mounted in a 19 inch rack.

The compressors combine functions not normally found in one single unit. The heart of the compressor is a very high quality voltage controlled amplifier, (VCA). Because of the extremely precise regulation characteristics of the VCA used, advantage can be taken of the "forward regulation" principle. That is to say, the control voltage can be derived from the input signal, rather than from the output signal; which allows for a more complex and accurate control voltage computation.

The simplified block-schematic diagram below shows this principle.

Fig. 1



For ease of use as a "user's reference manual", the following text, describing the individual functions of the compressor refers to the mechanical lay-out for one channel as shown on page 5. The other channel is identical. At the end of each section in the text there is a suggested setting to be used as a "start-point".

#### 1. "BY PASS".

The BY PASS switch simply disconnects the VCA control voltage from the VCA. In this way a click free switch-off of all the dynamic gain control functions is achieved.

As all the gain computing electronics remain connected to the input signal, the att/gain meter and the dynamic controls, (with the exception of OUT LEVEL), may be adjusted without affecting the signal path. Also, the control voltage is still active and can be used to control another compressor or other device.

Setting: ON.

#### 2. "GAIN/ATT".

The GAIN/ATT control sets the maximum gain or attenuation imposed on signals below the compressor threshold level, in the range 0dB to 20dB.

Most compressors have controls only for "threshold", "ratio" and "output level". The amount of compression or expansion required is thus primarily adjusted by "ear".

However, with the NTP 179-160, the amount of gain or attenuation required for a particular input signal, can be predicted by the operator. If for instance the console level meter indicates that the low level passages need 8dB of gain, then the GAIN/ATT control is simply set at 8dB. -See figure 4 and section 7.

Suggested setting: 8dB.

#### 3.4 "ATT/GAIN METER" ; "LIM"

The 16 segment LED meter monitors the VCA voltage and thus reads relative gain or attenuation caused by any or all functions in the module.

Gain caused by the output level control is not indicated. The uppermost LED (the red LED) is not part of the meter, but is purely indicator for, when the limiter is in operation.



#### 5. "COMP/EXP".

The COMP/EXP switch selects either compression mode or expansion mode of operation. Theoretically, expansion is the inversion of compression. I.e. if a certain signal level at the input causes a gain of 6dB, when the unit is switched to the compression mode, then the same signal level at the input will cause an attenuation of 6dB, when the unit is switched to the expansion mode. Note that due to mathematical reasons, an exact inversion of the ratio slopes cannot be achieved. (See figure 4, e.g. the +10dB slope in the compression mode is different from the -10dB in the expansion mode).

Suggested setting: "COMP".

#### 6. "RATIO".

The RATIO control sets the compression or expansion slope in the range 1.3:1 to 10:1 for compression and 1:1.25 to 1:1.9 for expansion. The scale marked on the front panel of the module is true for compression only, and the table below shows the relationship between the printed scale and the actual expansion ratios.

Compression Ratio	1.3:1	1.5:1	2:1	5:1	10:1
Expansion Ratio	1:1.25	1:1.3	1:1.5	1:1.8	1:1.9

Also refer to figure 4 on the curve sheet and section 5.

Suggested setting: 2:1.

#### 7. "REF LEVEL".

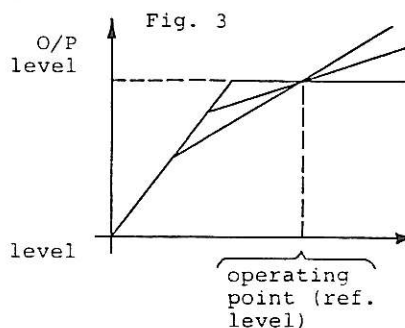
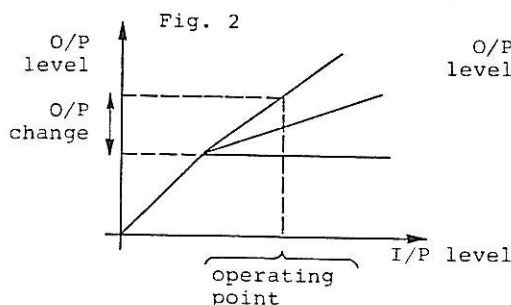
REF LEVEL is defined as the input signal level for which the compressor will impose no relative gain or attenuation (independent of ratio setting). Therefore the REF LEVEL control is set so that the att/gain meter reads 0dB for a normal input level being sent from the preceding equipment. During this adjustment "LIM LEVEL" should be set at a level high enough to prevent activating the lim. function (see 4. "LIM").

The REF LEVEL should be set before the module is used for any programme control.

Suggested setting: Ref.mark (+6dBu).

#### Additional Information:

While most compressors have a threshold and a ratio control for a particular operating point, a change in the ratio control will cause a change in the output level. This means that the operator will have to compensate for this change by readjusting the output level control. This is shown in figure 2 below.



In contrast to this the 179-160 electronics allow the output to remain constant for any ratio setting, as the characteristic curves all pass through the same point, for a given operating point, provided that the input operating level is equal to the REF LEVEL.

#### 8. "OUT LEVEL".

The OUT LEVEL control provides 0 to 12dB of gain and is used as a normal "gain-make-up" control, so that the output from the module will "level match" the succeeding system.

Suggested setting: Ref. mark (0dB).

#### 9. "LIM LEVEL".

The threshold level of the limiter can be set by the LIM LEVEL control. The attack and recovery times of the limiter are fixed and are quite independant of all the selected compressor time constants.

The limiter function is provided with an instant clipping circuit which ensures "soft" clipping of fast signal peaks and will only overshoot 3dB above the static limiter threshold.

The LIM LEVEL is not dependant on the output level setting.

Suggested setting: Ref. mark (+9dBu).

#### 10. "ATTACK TIME".

The ATTACK TIME control sets the time taken by the compressor or expander to respond to an input signal which is suddenly applied, before the function takes effect. This can be varied from 0.1 milliseconds (very fast) to 100 milliseconds (slow). If the attack time is fast, the function will be applied almost immediately, even to a signal of short duration.

The figures printed on the scale are derived from the following definition:

The duration of a tone-burst required for 7dB of gain reduction, provided that the tone burst amplitude is so that a continuous signal having the same amplitude would cause 10dB of gain reduction.

Suggested setting: 3mS.

#### 11.12. "RECOVERY TIME".

The RECOVERY TIME can be varied between 0.1 seconds and 6 seconds. Within this range the recovery takes place linearly. When the RECOVERY TIME control is set at the maximum clockwise position, a programme dependant dual time constant recovery function is selected. When this occurs the light emitting diode (LED) marked AUTO is illuminated.

Generally when the input signal has a short duration, the recovery time can also be short. But when the input signal is of long duration, the recovery time should be set slow, or in the AUTO mode which will accomodate a wide range of input signal duration.

#### Additional Notes:

Normally, in a compressor, short recovery times are to be avoided when low frequencies are present, due to distortion. To overcome this problem and to some extent allow for short recovery times on low frequency signals, an automatic, frequency dependant, recovery delay circuit has been incorporated. This circuitry inhibits the recovery function for a time equivalent to 2½ periods of the predominant frequency content of the signal. In this way distortion is minimized on most signals containing low frequencies, when a short recovery time is required for artistic reasons.

Note that the printed scale for recovery times is derived from the same definition as in section 10.

Suggested setting: 3S or "AUTO".

#### 13.14. "HOLD LEVEL".

The HOLD LEVEL function is particularly useful on programme material, such as speech, etc. When a compressor is being used on speech, in the normal way, and the speaker stops to breath or to turn over page in the script, then the compressor will start to recover before the speech begins again. This can cause the "pumping" effects so often associated with speech recording. However, if a HOLD LEVEL is selected so that it just below the total dynamic range of speaker (before compression is introduced), then the normal recovery function is inhibited, and the gain will remain constant. The selected recovery function is reestablished when the speech continues.

The threshold level selected by the HOLD LEVEL control operates with a "floating" or "dynamic" reference. This means that even if the average level of the incoming signal varies above or below the initial average level, the setting of the HOLD LEVEL can remain the same, as this setting is not level dependant.



The associated LED 14 indicates, when the hold function is activated. The threshold of this function is variable from -10dB to -50dB.

Suggested setting: -10dB for speech, -30dB for music.

#### 15. "GROUP".

The internal gain control voltage generated by the compressor units may be connected the "control voltage grouping" connector by means of the GROUP switch.

The gain of the compressor will be defined by the highest control voltage which appears. It means if an external control voltage (from another compressor e.g.) is higher than the voltage generated by the actual compressor, the gain will be defined by the external voltage.

If both GROUP selectors are positioned at A, both compressors are linked together for stereo operation. They may at the same time be controlled externally at pin 1 at the "control voltage grouping" connector.

It is also possible to individually control each of the two compressors from external. The GROUP selector may then be set in position B for the actual compressor. The external voltage is connected to pin 2 for the left compressor and pin 3 for the right.

If two or more compressors are interconnected in this way, a control voltage "group" is made within which the gain of all the compressors involved is defined by the one that generates the highest control voltage. The polarity of the control voltage is unaffected by the COMP/EXP switch, and therefore the "grouping" can be used either to achieve conventional gain tracking (by equal settings of GAIN/ATT control on each unit), or one compressor operating on COMP mode, can be used to gate another compressor in EXP mode.

It should be noted that the gain control voltage is generated by the compressor section only, and that gain variations caused by the limiter or gate sections within a specific unit do not effect the gain in the "grouping".

The compressor operates as a control voltage source, even if the compressor function itself is switched "off" by the BY PASS switch.

The maximum number of units connected in the group should not exceed ten.

In position "off" the compressors are internally controlled.

Suggested setting: "OFF".

#### 16.17. "GATE LEVEL".

The gate threshold is set by the GATE LEVEL control in the range 0dB to -50dB, and the LED indicates, when the modulation level is below the threshold level, i.e. the LED IS "on", when the gate turns the incoming programme "off".

See figure 6 in the curve sheet.

Suggested setting: -50dB.

#### 18. "GATE FUNCTION".

The GATE FUNCTION control sets the maximum attenuation imposed on input signals below the gate threshold level. The actual over all gain/attenuation will be the sum of compressor gain (set by control 2) and the gate attention. Figure 7 on the curve sheet shows the static input/output characteristics obtainable for various settings of the GATE FUNCTION control.

Suggested setting: 'Ref.Mark 10dB.

#### 19. "GATE TIME".

The three position toggle switch for GATE TIME CONTROLS THE SPEED with which the gate becomes active again (closes) after a signal which has opened the gate, decays below the gate threshold. If the signal decays quickly, then the gate time can be fast. But if the signal decays slowly, then the gate time should be slow, unless a special effect is required. The attack time for the gate is fixed and is extremely fast.

Suggested setting: "MED".

FIG. 4

Static comp/exp characteristics for various GAIN settings.

Output level dBu

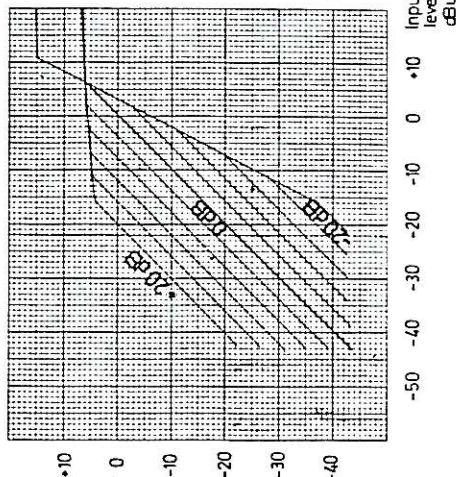


FIG. 5

Static comp/exp characteristics for various RATIO settings.

Output level dBu

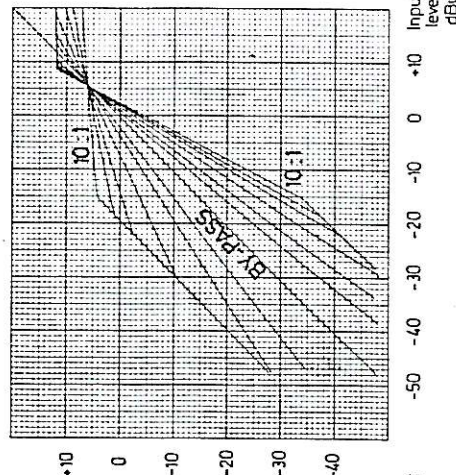


FIG. 6

Static GATE characteristics for various GATE LEVEL settings.

Output level dBu

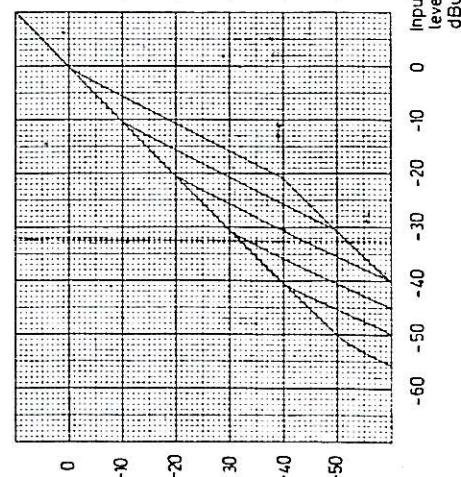
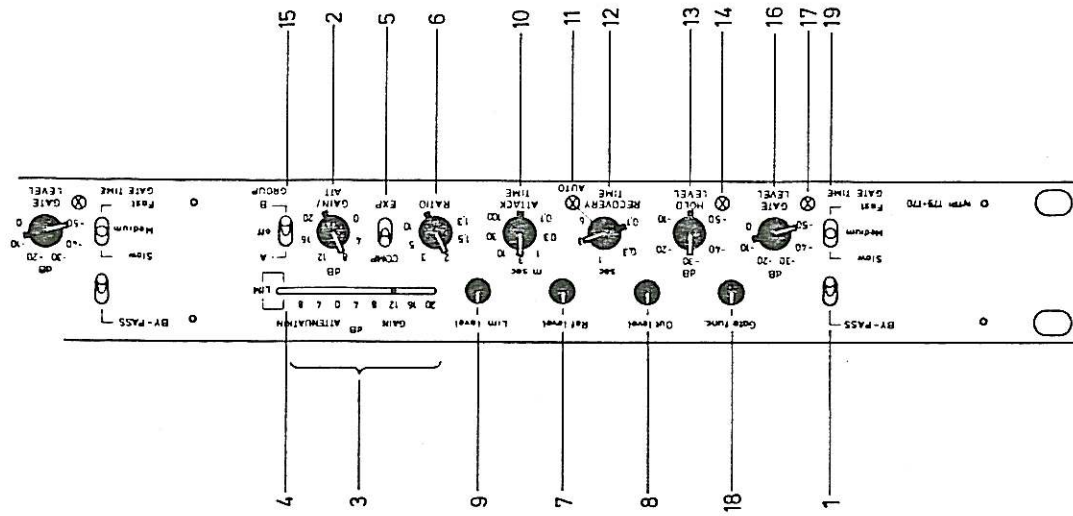
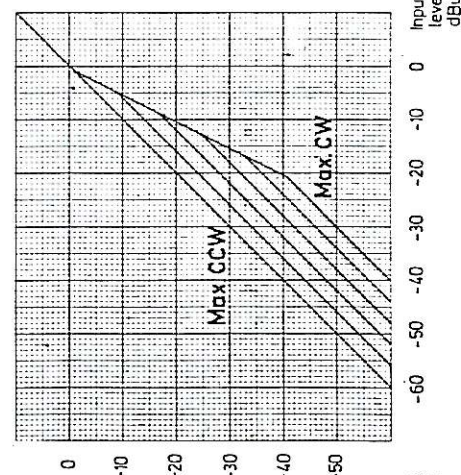


FIG. 7

Static GATE characteristics for various GATE func. settings.

Output level dBu



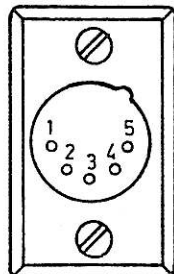
Pos.:	Antal:	Materiale:	Behandl:	Del. al:
Målestok:	mm			
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Compressor  
Users manual

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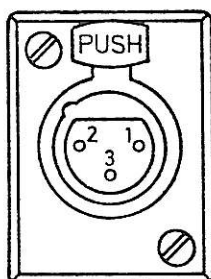


Control voltage grouping



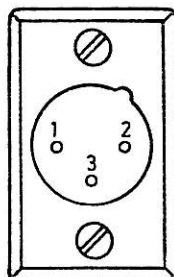
- |       |  |
|-------|--|
| Pin 1 | Control voltage group "A" left and right |
| 2     | Control voltage group "B" left channel   |
| 3     | Control voltage group "B" right channel  |
| 4     | Control reference                        |
| 5     | Shield                                   |

Input connectors



- |       |        |                  |
|-------|--------|------------------|
| Pin 1 | Shield | } floating input |
| 2     | 180°   |                  |
| 3     | 0°     |                  |

Output connectors



- |       |        |                   |
|-------|--------|-------------------|
| Pin 1 | Shield | } floating output |
| 2     | 180°   |                   |
| 3     | 0°     |                   |