DYNAMICS 2806
USER MANUAL

FRAP
AUDIO

Dear customer,

First of all, we'd like to start everything with a sincere "thank you for purchasing your new Dynamics 2806." We mean it, and we hope you'll have a fantastic time with your new piece of gear.

Then, in the well-established practice of introductory letters, a company usually says something about itself and its product that you may have already racked in your studio without reading the manual. (Don't worry, we all do that!) So here we go, then.

The Dynamics 2806 is the first product we've ever made, and we hope you'll find yourself comfortable with it. In fact, we hope that it will fit your workflow so naturally that you'll almost forget it's there.

By definition, dynamics is wherever there's movement and includes an infinite number of variables and results. Therefore, we aimed to create a tool that could handle dynamics as a global concept rather than something related to specific genres, instruments, or circumstances.

We realized that a performer doesn't need complicated tools to create complex dynamics. Take a simple object like a glass: you can bow its rim with your finger, strike it with your fingernail, or smash it on the floor. Tool-wise, nothing has changed, but the results are dramatically different: what changed is the *interaction* between the performer and the glass.

As a recording engineer, you'd hardly use the same tools and settings to capture and process these three different sounds. And here's the idea behind the Dynamics 2806: pack together two devices for two opposite purposes (a compressor and an expander) with as straightforward a circuit as possible and make them interact to achieve the widest gamut of behaviors.

It may take some time to get used to such interactions, but eventually, they'll become natural and almost spontaneous.

For this purpose, we chose to arrange this manual by levels of detail: it starts with an overview that should allow you to begin using the Dynamics 2806 right away, with a block scheme and an interface description. This section tells what every knob, button, and switch does.

Then, if you want to dive more into its concepts and design choices, you'll find a more detailed discussion about the key parameters, including the reasons behind their role in the signal path and some suggested practices. This section tells what you can do with the Dynamics 2806.

Let's start with the manual, then!

Table of Contents

Important Notice

Frap Audio is a division of Frap Tools srls. The Frap Tools srls warranty covers the following products (hereinafter 'Frap Audio'), for two (2) years following the date of purchase. This warranty covers any defect in the manufacturing of this product. This warranty does not cover any damage or malfunction caused by incorrect use as described in the following instructions.

The warranty covers replacement or repair, as decided by Frap Audio. Please contact customer service at support@frap.audio for a return authorization.

Frap Audio warrants that your new Frap Audio product, when purchased from an authorized Frap Audio dealer, shall be free of defects in materials and craft for a period of two (2) years from the original date of purchase. Please contact Frap Audio for warranty and service outside of Europe. During the warranty period, Frap Audio shall, at its sole option, either repair or replace any product that proves to be defective upon inspection by Frap Audio. Frap Audio reserves the right to update any unit returned for repair and to change or improve the design of the product at any time without notice. This warranty can be transferred to anyone who may subsequently purchase the product provided that such transfer is made within the applicable warranty period and that Frap Audio is provided with all of the following items:

· all warranty registration information for the new owner;

· proof of the transfer within thirty (30) days of the transfer purchase, and a photocopy of the original sales receipt.

Frap Audio shall determine warranty coverage in its sole discretion: this is your exclusive warranty. Service and repair of Frap Audio products are to be performed only by Frap Audio or an authorized service company. Unauthorized service, repair, or modification will void this warranty.

Please follow the given instructions for the use of the device because this will guarantee the correct device operation. Since these instructions also include indications concerning Product Liability, they must be read carefully. Any claim for defect will be rejected if one or more of the following points is not observed. Any disregard of these instructions can void the warranty.

· The devices may only be used for the purpose described in this operating manual. Due to safety reasons, the devices must never be used for purposes not described in this manual. If you are not sure about the intended purpose of the devices, please contact an expert or Frap Audio at the email address above.

· Do not use or store the devices in humid places. Avoid contact with any liquid.

· Do not touch any component of the devices when it is power or connected to any power source.

· Do not place the devices on unstable carts, stands, tripods, tables, or other surfaces, or on surfaces that are not perfectly plane. Such behavior may cause the devices to fall, which could result in human injury, property damage or improper functioning of the devices themselves.

· The devices are designed for use only when safely and tightly mounted in a proper 500-series lunchbox, made of non-flammable materials. If you are not sure about the intended purpose of the devices, please contact an expert or Frap Audio at the email address above.

· Do not ever leave the devices switched on when not in use.

· To prevent fire, never place any candle, flame, or other sources of heat on or near the devices.

· Transport the devices only in the original box with original packaging or when safely and tightly mounted in a proper 500 case and handled with care. Never let the devices fall or topple. Make sure that during transport and while in use the devices and their case have a proper stand and do not fall, slip or turn over because of potential human injury to persons or property damage. Any damage from physical abuse such as dropping the unit, impact from hard objects or damage to external

components as a result of negligence will void this warranty.

· Never expose the devices to temperatures above +40°C or below 0°C.

Before any operation, also verify the operating temperature ranges of all the modules and the power boards in use. Do not keep or leave the case that hosts the device, or the devices themselves near heat sources.

Any modification must be carried out only by Frap Audio or an authorized service company. The devices may not be modified in any way by any parties not expressly authorized by Frap Audio. Any repair, modification, tampering, or attempted repair made by unauthorized personnel will void this warranty.

Frap Audio cannot be held responsible in any way for problems to persons or property or to the devices themselves, if the devices are installed improperly, or if they are improperly used, maintained, or stored.

Any device shipped to Frap Audio for return, exchange, warranty repair, update, or examination must be sent in its original packaging. Any other deliveries will be rejected. Therefore, you should keep the original packaging, and any technical documentation or manual provided. The device must be shipped only with the original packaging. As specified on the product box, this box is not intended for shipment: if you bought the device directly at a physical reseller's shop, you should put the device in the original packaging and put the packaging in a larger box with proper packaging destined for shipping. If you received the device via carrier or any post service, it should have come with a proper double box packaging.

All non-warranty services are subject to a minimum fee of €50.00+VAT (within the European Union). The customer must pay for shipping to Frap Audio; Frap Audio will cover return shipping costs.

It is important to note that the front panel of our modules may get warm and may warm up the case where it is mounted. Please do not be alarmed, as this is normal and is part of its standard operation.

Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise. Continued use may lead to fire. Immediately unplug the equipment and contact your dealer or Frap Audio at the address above for advice.

Never attempt to repair this product yourself. Improper repair work can be dangerous. Never disassemble or modify this product. Tampering with this product may result in injury or fire and will void your warranty.

Do not allow foreign matter to fall into the equipment. Penetration by foreign objects may lead to fire.

If water or other liquid spills into this equipment, do not continue to use it. Continued use may lead to fire. Unplug the power cord immediately and contact your dealer or Frap Audio at the address above for advice.

The internal components of our modules and power supplies can get very hot. Do not touch any internal components while it is connected and/or powered and after they completely cool down after use for at least 30 minutes.

Setup and Connectivity

The Dynamics 2806 is built in the API 500-series format. It is two-unit wide and uses two inputs and two outputs.

To install the unit, turn off your 500-series lunchbox and remove the power cord from the power socket. Slide the unit into place, making sure that the plugs in the back are properly aligned to the lunchbox's sockets, then fasten it with the four screws.

Once done, turn on your equipment and let it warm for at least five minutes.

The unit has two inputs and two outputs.

Input 1	Main input
Output 1	Main output
Input 2	External sidechain input
Output 2	Auxiliary output

The auxiliary output varies its behavior according to the External sidechain switch position, see below, section **A.3**.

Concept

The Dynamics 2806 is a single-VCA mono expander and compressor for the 500-series format designed to handle a wide dynamic gamut in the most straightforward way.

We carefully chose the components and the feature set to make its architecture light, flexible, and capable of both subtle editing and creative compression. It is meant to be a reliable tool that fits your workflow, complements your gear, and helps you achieve your sound without wasting time.

The two circuits have independent signal paths and controls. The compressor reduces the gain when the sound is above a given threshold (thus reducing the dynamic range); the expander reduces the gain when a signal is below a given threshold (thus expanding the dynamic range). The way these circuits interact is the core of Dynamics 2806 and allows for infinite practical applications in the professional studio environment.

In both circuits, the signal feeds a filter set and then an envelope follower (rectifier). The resulting control voltage feeds two integrators (time constants) that generate two independent sidechains, both working over the VCA level.

The expander sidechain monitors the VCA input signal (feed-forward), while the compressor sidechain monitors the VCA output (feedback), which can be pre-makeup or post-makeup.
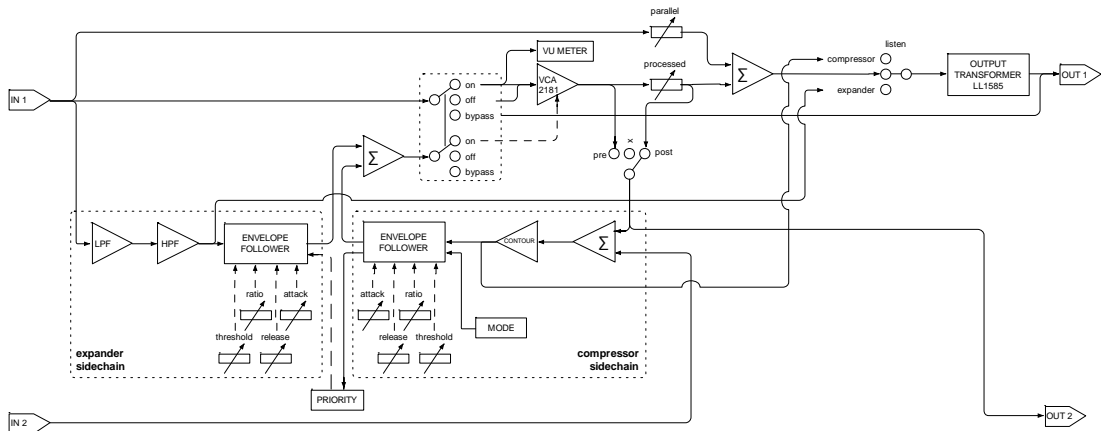
Even if the compressor is always after the expander, it is possible to force the expander to idle as long as the compression is active.
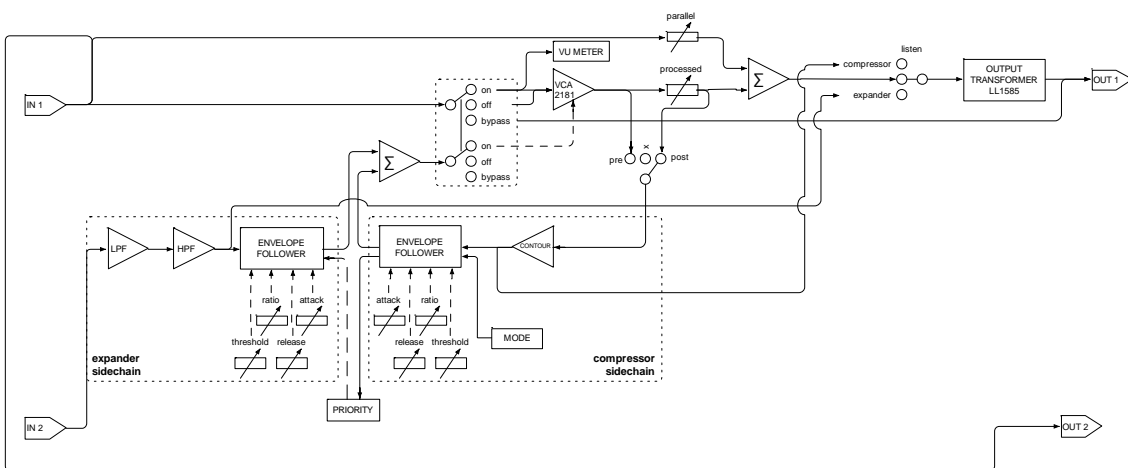
Block Diagram and Signal Flow
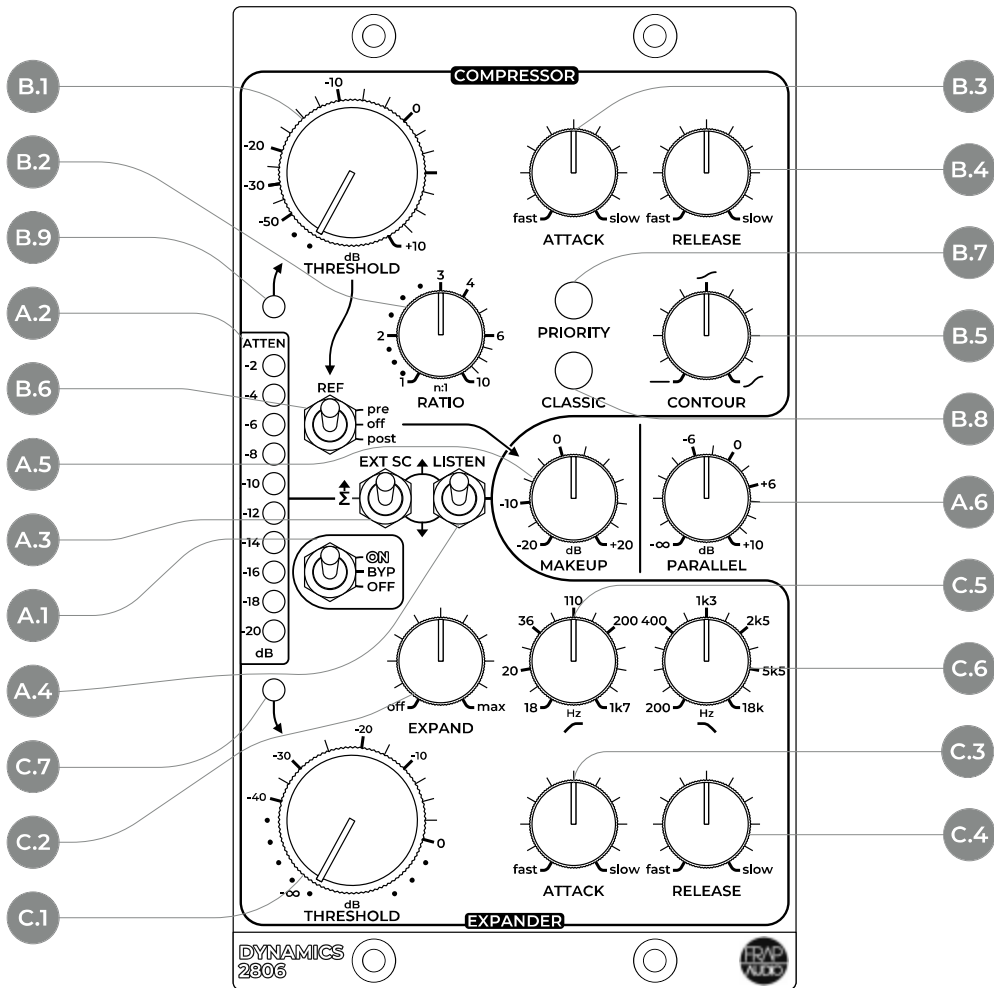
2806 flowchart - EXT SC set to "compressor"
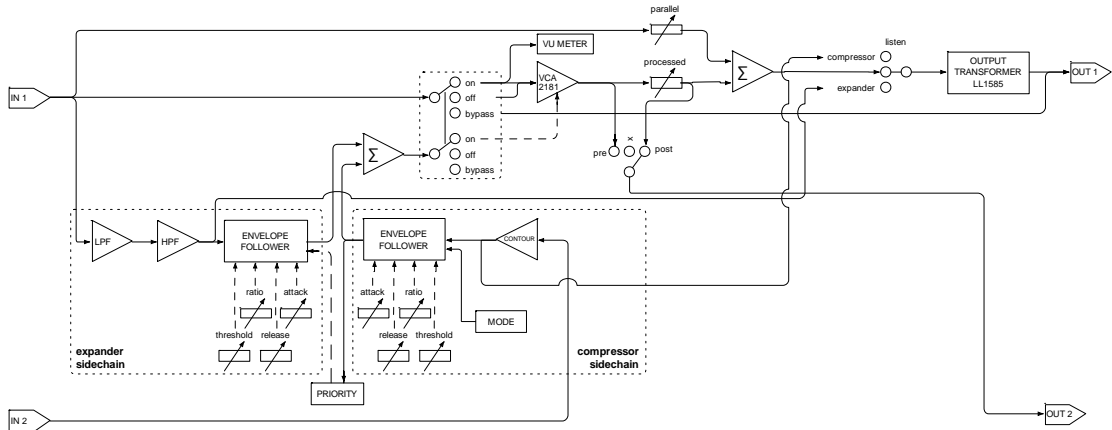
2806 flowchart - EXT SC set to "∑"

2806 flowchart - EXT SC set to "expander"

Interface

Controls

A. Global controls

These parameters affect both the Compressor and the Expander sections.

A.1. On/bypass/off switch

Turns the processor on, off, or bypasses it.

- On: The device is active.
- Byp: The input is directly routed to the output (hard bypass).
- Off: The device is off, but the sound still passes through its circuit.

In both Bypass and Off mode, there is no signal processing going on. When set to Off, however, the signal passes through the VCA, so it is possible to retain its "color" if desired.

The hard bypass allows the signal to pass in and out even when the unit is unpowered.

A.2. Attenuation LEDs

These LEDs display the attenuation performed over the incoming signal. The two Compressor and Expander LEDs (B.8 and C.7) tell whether the displayed attenuation is performed by the compressor or the expander, respectively.

A.3. External sidechain switch

It selects the path of the external sidechain sound connected to the sidechain input. If no sound is connected, this switch has no effect.

- Up: sends the external sidechain to the compressor section before the Contour stage.
- Mid (a.k.a. Sum): same as above but summed to the internal sidechain.
- Down: sends it to the expander before the low-pass and hi-pass filter.

Every position also changes the signal sent to the auxiliary output, see below the **External Sidechain Options**.

A.4. Listen

It routes to the output the sound currently passing through to the compressor or expander filters (. B.5, C.5-C.6) for fine adjustments. The sound can be either internal or external.

- Up: listens to the compressor source.
- Mid: the listen function is inactive.

- Down: listens to the expander source.

A.5. Priority

The Dynamics 2806's default behavior lets both the compressor and the expander work at the same time over the VCA.

The Priority button changes this behavior by making the expander idle as long as the compressor is working, thus giving the compressor "priority" over the expander. When pushed, the expander will work only when the compressor is not reducing the signal's gain. Read more in the section below about **Compressor and Expander's Interaction**.

A.6. Makeup

Increases or decreases the signal's amplitude after the expansion and compression stages.

A.7. Parallel

Controls the unprocessed signal's amplitude, like when working on a mixing desk with separate buses. Please note that this is not a crossfade knob: read more in the section about **Parallel Compression**.

B. Compressor

These parameters refer to the compressor section only.

B.1. Reference Switch

The compressor has a feedback design, meaning that its circuit monitors the VCA output. However, it is possible to define two options for the source signal: before or after the makeup gain.

- Pre: the compressor source is taken before the makeup gain.
- Off: the compressor is off (only the expander will work).
- Post: the compressor source is taken after the makeup gain.

The latter option has a significant impact over the 2806 behavior. See the section below about **Compressor/Limiter**.

B.2. Threshold

Defines the dB threshold above which the Dynamics 2806 reduces the signal's amplitude.

B.3. Ratio

Defines the amount of amplitude reduction in relation to the incoming signal.

B.4. Attack

Defines how fast or slow the Dynamics 2806 reacts to the signal crossing the threshold and begins the gain reduction.

B.5. Release

Defines how fast or slow the Dynamics 2806 ceases to attenuate the signal's level once it goes back below the threshold.

B.6. Contour

Attenuates the low end of the signal feeding the envelope follower. When fully counterclockwise, the reference signal is unfiltered.

B.7. Classic mode

Changes the compressor's time constants to a slower configuration. It can add some noticeable artifacts (the "pumping" sound) but with less harmonic distortion. See also the section below on **Time Constants**.

B.8. Compressor LED

When lit, it shows that the compressor is working. If the Priority (B.7) is not activated, it may work together with the expander.

C. Expander

These parameters refer to the expander section only.

C.1. Threshold

Defines the dB threshold below which Dynamics 2806 reduces the signal's amplitude.

C.2. Expander Level

Defines the amount of attenuation.

C.3. Attack

Defines how fast or slow the Dynamics 2806 ceases to attenuate the signal's level once it gets back above the gain reduction threshold.

C.4. Release

Defines how fast or slow the Dynamics 2806 attenuates the signal once it gets below the gain reduction threshold.

C.5. High-pass Filter

Defines the cutoff frequency for the low end of the signal sent to the expander's envelope follower.

C.6. Low-pass Filter

Defines the cutoff frequency for the high end of the signal sent to the expander's envelope follower.

C.7. Expander LED

When lit, it shows that the expander is working.

Workflows

While most of the controls are exactly what you'd expect from a compressor or expander, some others are more unconventional and capable of altering the way you can approach the Dynamics 2806.

Compressor/Limiter

The Pre position of this switch is the compressor's regular behavior: it has no input gain, and the makeup knob compensates for the amplitude reduction.

The Post position shifts the feedback point after the Makeup gain: now, the Makeup knob controls the signal's gain before the compressor, and the Threshold becomes the main output parameter. With this setting, you can greatly increase your program's RMS and approach the 2806 as a limiter or an 1176-type device.

External Sidechain Options

As soon as a signal is patched to the second input, it will immediately take control of the Dynamics 2806's sidechains. However, there are three possible scenarios that depend on the External Sidechain switch's position.

When set to Expander, the signal patched to the input 2 will override the internal signal and drive the expander's sidechain. The compressor continues to work with the internal sidechain. The output 2 (the Service output) provides a copy of the unprocessed sound before the VCA (like output 1 when the device is set to Bypass).

When set to Compressor, it will override the internal compressor's sidechain. The expander continues to work with the internal sidechain. The output 2 provides a copy of the processed compressor's sound, according to the Reference switch.

When set to Sum, both the internal and external sidechains will feed the compressor's time constants. The expander continues to work with the internal sidechain only, and the output 2 provides a copy of the processed compressor's sound, according to the Reference switch.

Below you can find a table that display the external sidechain's signal path and the service output's signal per each switch position.

Setting	Sidechain input (input 2)	Auxiliary output (output 2)
Expander	To the expander sidechain	A copy of the unprocessed sound
Compressor	To the compressor sidechain	A copy of the processed sound
Sum	To the compressor sidechain summed to the internal sound	A copy of the processed sound

At every position the external sidechain will pass through the filters, either the expander's ones or the compressor's contour.

Time Constants

The Dynamics 2806 uses more time constants in parallel to adapt to the incoming signal's dynamics and carefully treat its transients. As a result, its response can be very fast.

With some sounds, an excessively fast response can create some harmonic distortion. Such distortion might be a desirable effect sometimes, but some others you may need a smoother response.

For this reason, the Classic button reconfigures the time constants and make their response much slower. It can lead to the conventional artifacts that you'd expect from classic machines, like the "pumping" effect.

Compressor and Expander's Interaction

By default, the compressor and the expander work simultaneously over the same VCA. However, in some cases, you may want to keep them separate, especially when their thresholds are very close.

The Priority button, as the name implies, prioritizes the compressor, and allows to block the expander whenever the compressor is working, to make sure that it doesn't get in the way.

If you are in Priority mode, whenever the Expander LED lights up it means that the compressor is not working.

Parallel Compression

We approached the parallel compression with the mixing desk workflow in mind, where one defines the balanced of processed and unprocessed sounds via independent faders.

We thus chose to design the Makeup knob so that it can attenuate the signal by 20 dB, other than amplify it, and add a dedicated knob that can bring the unprocessed signa in the mix.

This way, it is possible to approach the compressor like a mixing desk, starting from the unprocessed sound with the Makeup knob fully counterclockwise, and then carefully dose the processed signal in the mix.

Patch Sheet

Print or screenshot this page to note down your favorite settings.