

# CHANDLER LIMITED® TG MICROPHONE CASSETTE USER MANUAL



# TG MICROPHONE CASSETTE

<b>INTRODUCTION</b> .....	<b>3</b>
TG Microphone Cassette .....	3
History .....	3
<b>SHIPMENT AND STORAGE</b> .....	<b>4</b>
Packaging .....	4
<b>INSTALLATION</b> .....	<b>5</b>
Power .....	5
Audio Input & Output Connections .....	5
Link .....	5
<b>TG2</b> .....	<b>6</b>
Coarse Gain .....	6
Fine Gain .....	6
Rumble Filter .....	6
Utility Cluster .....	7
<b>CURVE BENDER</b> .....	<b>8</b>
Treble .....	8
Bass .....	8
Presence .....	8
EQ In .....	8
Output .....	8
<b>TGI OPTO</b> .....	<b>9</b>
Important Notes on Use .....	9
Hold .....	10
Output .....	10
Attack .....	10
Release .....	10
Knee .....	11
Bypass .....	11
Link Operation .....	11
<b>SERVICE</b> .....	<b>12</b>
United States .....	12
International .....	12
<b>CE CERTIFICATION</b> .....	<b>12</b>



## INTRODUCTION

### TG Microphone Cassette

Thank you for purchasing the Chandler Limited TG Microphone Cassette, you now own a piece of EMI/Abbey Road Studios official equipment.

Chandler Limited's TG Microphone Cassette is a fully featured mono mixing console channel strip, incorporating elements of the historic EMI/Abbey Road Studios TG12345 recording and mastering desks of the late '60s and '70s.

The TG Microphone Cassette is comprised of Chandler Limited's TG2 pre-amplifier coupled to a Curve Bender EQ section, and a fully independent TG1 Opto compressor, delivering the historic TG sound with modern conveniences and flexibility.

Your Chandler Limited TG Microphone Cassette has been carefully crafted and built by hand at Chandler Limited's factory in Shell Rock IA, U.S.A., using through-hole components for the ultimate analog experience.

At Chandler Limited we are proud of our American made products and we hope you like them!

Please feel free to call our shop anytime for help or questions.

Phone: (319) 885-4200.

## History

Conceived from meetings in 1967 between Abbey Road and EMI's Central Research Laboratories teams, the EMI TG12345 Mark I desk ushered in a sea of change in sound and flexibility at Abbey Road Studios.

Installed in Abbey Road's Studio Two in November 1968 and making its debut on an 8-track recording by the Shadows, the transistorized desk marked a departure from the earlier REDD valve consoles.

The new EMI TG12345 console was modular in design, with twelve dual-channel "microphone cassettes." Compared to their REDD predecessors, the TG desks featured expanded EQ, and for the first time ever, a compressor/limiter on every microphone and group cassette channel.

The EMI TG12345 desk helped shape the sound of the Beatles' final album, "Abbey Road," which was markedly richer sounding to that of the band's earlier work. The sonic qualities of classics like "Here Comes the Sun," "Come Together" and "Something" would have been very different without the EMI TG12345.

The desk encountered many revisions throughout the '70s and became the main recording console used throughout the studios until 1983. The EMI TG12345 console Marks I-IV were used on everything from Pink Floyd's "The Dark Side of the Moon" and "Wish You Were Here" to John Lennon's "Plastic Ono Band," George Harrison's "All Things Must Pass," to epic film scores including Raiders of the Lost Ark.

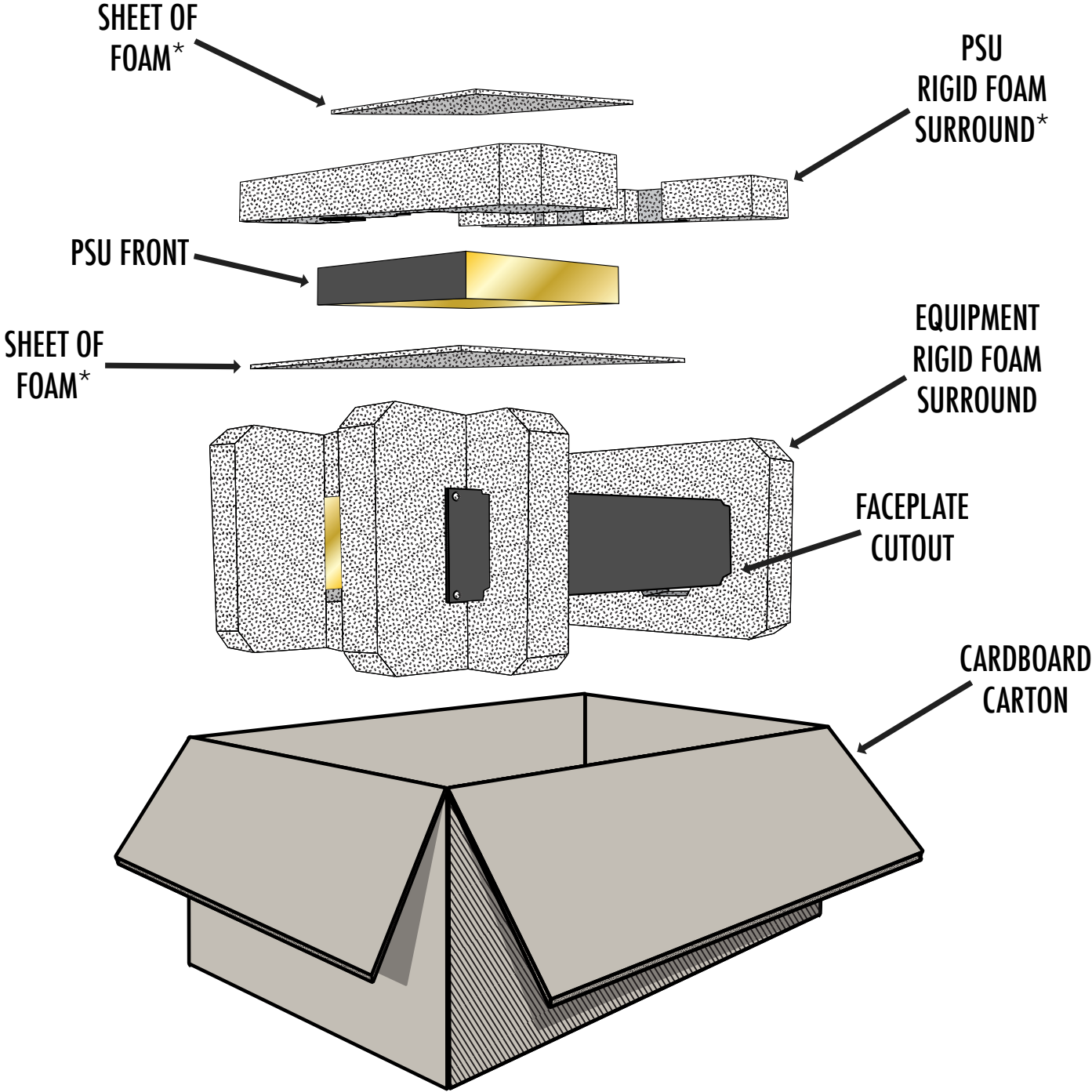


OFFICIAL  
EQUIPMENT

# SHIPMENT AND STORAGE

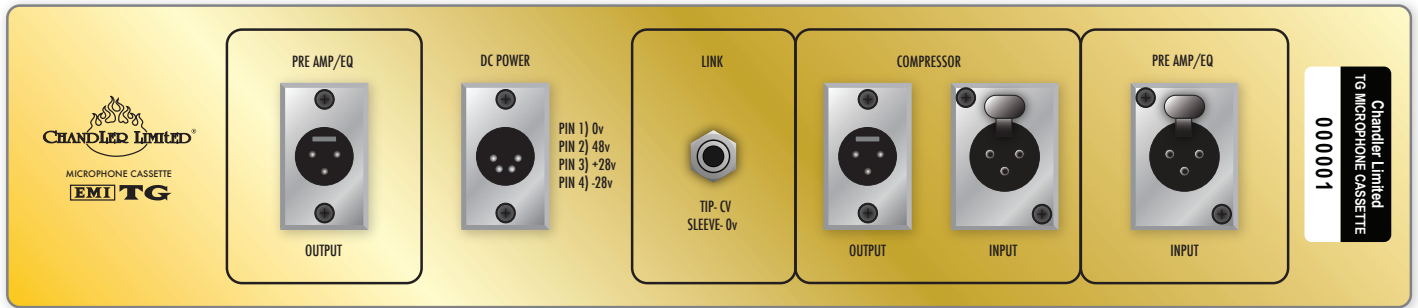
## Packaging

This packaging has been designed specifically for Chandler Limited equipment. The cardboard carton and rigid foam surrounds provide protection for shipment and storage. Please retain the container and associated materials for future use.



**\*Note:** PSU rigid foam surrounds and sheets are not included for equipment shipped without a power supply unit inside the equipment container.

# INSTALLATION



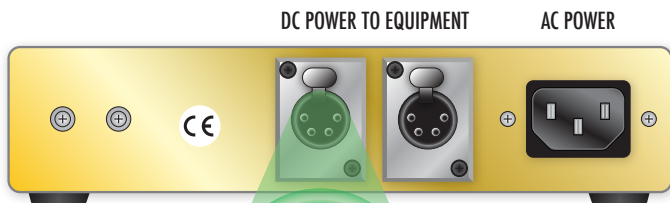
## Power

The TG Microphone Cassette is powered remotely by the Chandler Limited *PSU-1* power supply, and connected at the, four pin, *DC POWER* connector. The *PSU-1* is an external power supply capable of powering two units; the *PSU-1* is purchased separately.

### PSU-1 POWER SUPPLY



FUSE 1.5 AMPS 250 V



PIN 4) -28v  
PIN 3) +28v  
PIN 1) 0v  
PIN 2) 48v

### DC POWER CABLE - 4 PIN XLR



**Note:** Legacy *PSU-1* power supplies featured external grounding studs. As of mid 2015, grounding studs have been removed and resistance applied internally.

## Audio Input & Output Connections

On the rear panel of the TG Microphone Cassette exists, two sets of male and female XLR connectors, one pair for the *Pre Amp/EQ* section and the other for independent access of the *Compressor*. All audio XLR connectors are wired pin 2 hot.

**Note:** To include the TGI Opto in the audio path, a short XLR cable must be patched from the *Pre Amp/EQ* output XLR to the *Compressor* input XLR connector.

## Link

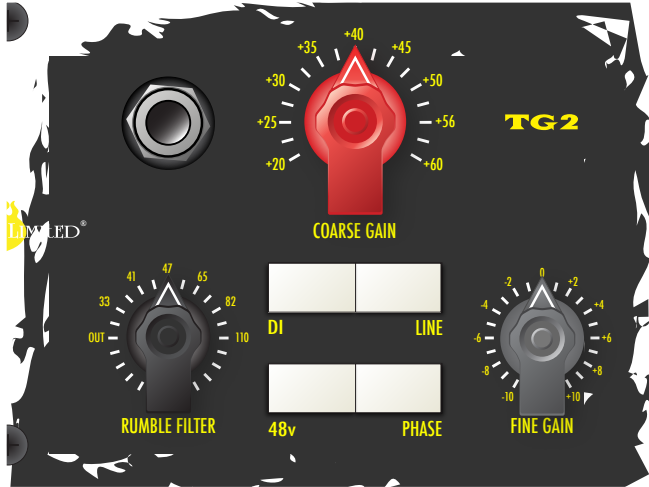
Provision has been made for stereo linking of two TGI Opto compressors, by means of the female 1/4" *LINK* connector located on the rear of the unit, and using a standard 1/4" cable. For further notes on operation under linked conditions, review the "Link Operation" section within the "TGI Opto" portion of this manual.

### LINK - USE STANDARD 1/4" TIP - SLEEVE CABLE



**Note:** Link cable purchased separately.

## TG2



The TG2 section of the TG Microphone Cassette is adapted from Chandler Limited's TG2 Pre Amp/DI, an historic recreation of the rare EMI TG12428 amplifier employed in the EMI mixing and mastering consoles of the late '60s and '70s.

### Coarse Gain

This rotary switch provides 9 steps of input gain of, 5 dB each, offering a selectable range between +20 dB and +60 dB. Use the Coarse Gain control to set the initial input gain of the pre-amplifier section.

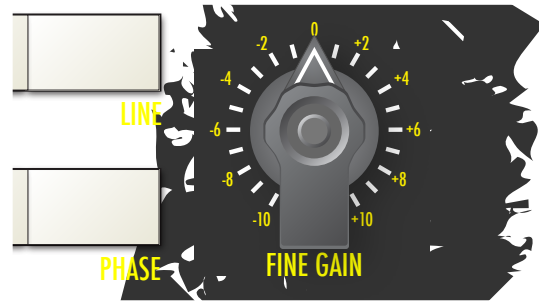


### Fine Gain

This control provides continuous gain trim of +/-10 dB; used in conjunction with Coarse Gain, a maximum of +70 dB gain may be achieved.

When gain staging, begin with the Fine Gain control set to middle (0), and adjust the Coarse Gain control to the ap-

proximate gain required. With Coarse Gain set, then adjust the Fine Gain control to trim the overall input +/-10 dB as needed.

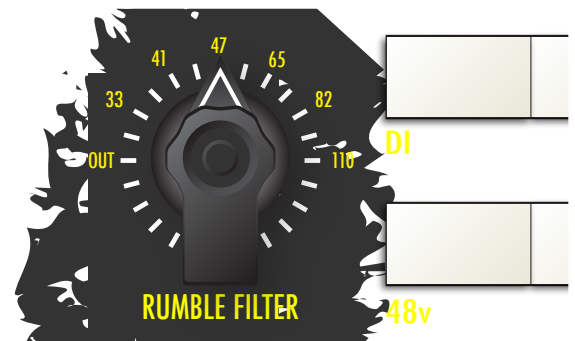


**Tip:** Fine Gain can be used as a great way to dial-in pre-amplifier coloration; experiment by sweeping across the control range while listening to the results.

**Historical note:** The separate switched Coarse Gain and continuous Fine Gain control-set was how gain staging was achieved on historic TG console Microphone Cassettes.

### Rumble Filter

The Rumble Filter is a low cut facility, providing an Out position and six frequency settings as follows: 33, 41, 47, 65, 82 and 110 Hz. The Rumble Filter may be fully disengaged from the pre-amplifier by setting its switch to the Out position. When active, this filter affects source present at the Pre Amp/EQ input XLR connector. This filter is useful for removing unwanted low frequency information from the source.



**Tip:** More than simply a low cut or high pass, the Rumble Filter has an effect on the overall signal and can be used as a powerful tone control.

**Historical note:** The original Rumble Filter was available on historic REDD.51 valve consoles, and activated via a plug-in jumper. The Rumble Filter was fixed at 30 Hz, and was unique in its circuit design.

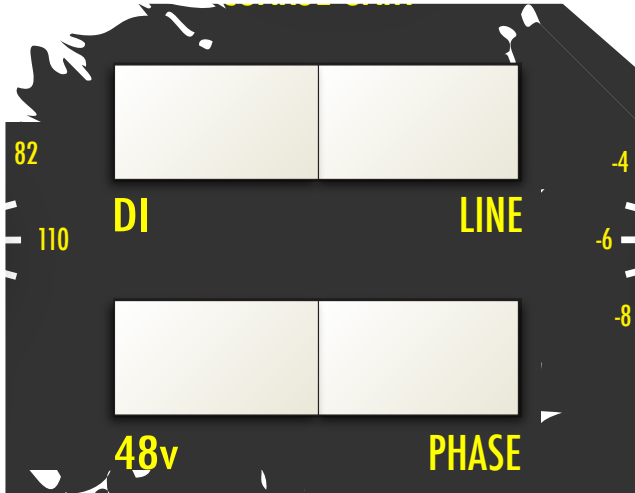


## Utility Cluster

Within the TG2 section, exists a cluster of utility push-button switches labeled as follows: *DI*, *LINE*, *48v*, and *PHASE*.

### DI

Provision is made for accommodation of instrument level sig-



nals by means of a direct injection facility or *DI*.

Engaging the *DI* facility is achieved by setting the push-button switch labeled *DI* to the inward position, this allows the Pre Amp/EQ section to accept instrument level signal via the 1/4" input connector, which is located on the front panel.

When using the *DI* facility, the output signal will be available from the Pre Amp/EQ section output XLR connector, which is located on the rear of the unit.

**Note:** Instrument level is not the same as line level signal.

**Tip:** Enabling the *DI* facility decouples the Pre Amp/EQ section's input XLR, therefore creating a handy mute feature.

### Line

The Pre Amp/EQ section is capable of accepting line level signal.

To accommodate line level signal into the Pre Amp/EQ section, first set the push-button switch labeled *Line* to the inward position, then apply line level source to the *Pre Amp/EQ* input XLR connector, which is located on the rear of the unit.

**Tip:** Sending line level source into the Pre Amp/EQ section is a great way to further process material by adding the rich harmonic texture available from this historic circuit; use a pair of TG Microphone Cassettes on the mix bus!

### 48v

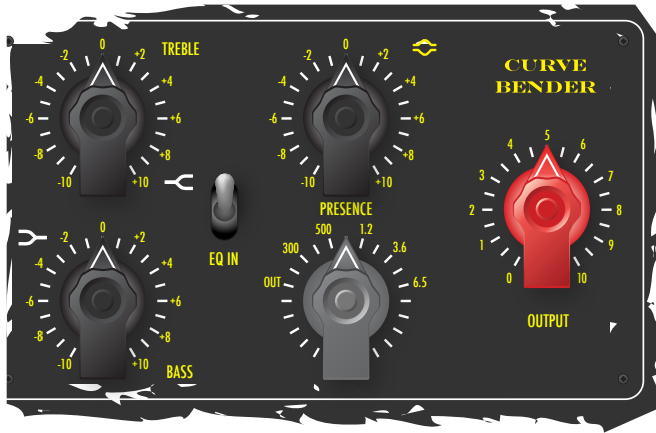
Provision is made for 48 volts phantom powering of condenser microphones, should they require it. Phantom power may be enabled by setting the push-button switch labeled *48v* to the inward position, use only for microphones that require it.

**Warning:** Only engage or disengage phantom power while a microphone is connected to the Pre Amp/EQ section of the cassette. Disconnecting a microphone while phantom power is on may cause damage to equipment downstream. Never use phantom power with ribbon microphones. Do not enable phantom power when a line level device is connected at the Pre Amp/EQ input XLR connector.

### Phase

The push-button switch labeled *Phase*, when set to the inward position, transposes the Pre Amp/EQ section input XLR leads, therefore reversing polarity of the incoming signal by 180°. This facility may be useful in multi-microphone scenarios, when a microphone is not ideally placed, a cable is wired incorrectly, or source material is out of phase.

## CURVE BENDER



The *Curve Bender* section of the TG Microphone Cassette is an adaption of Chandler Limited's acclaimed EMI TG12345 Curve Bender EQ, itself a greatly expanded recreation of the EMI TG12345 mixing console's channel equalizers of the late '60s and '70s.



## Treble

This shelving type EQ control is continuous, allowing for boost or cut of up to  $\pm 10$  dB, at a fixed frequency of 8.1 kHz.

## Bass

This shelving type EQ control is continuous, allowing for boost or cut of up to  $\pm 10$  dB, at a fixed frequency of 91 Hz.

## Presence

The *Presence* or mid band is a bell type EQ, and has two controls: boost or cut and frequency selection. The upper control is continuous, allowing for  $\pm 10$  dB boost or cut at the frequency selected by lower switch. The available presence frequencies are as follows: 300, 500, 1.2, 3.6 and 6.5 kHz. The *Presence* or mid band can be bypassed independently apart from the *Treble* and *Bass* controls by means of setting the frequency selection switch to the *Out* position.

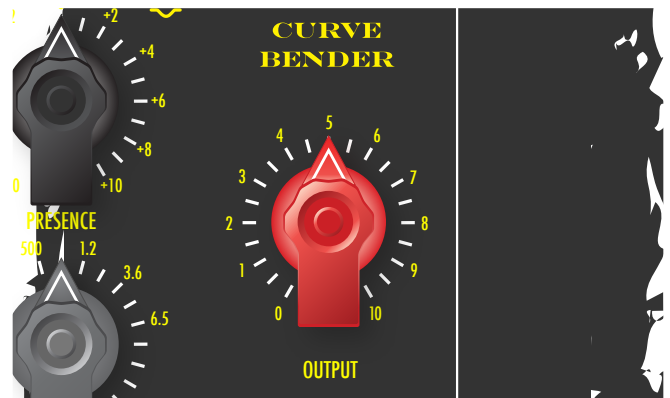
**Historical note:** 500, 1.2 and 6.5 kHz were frequencies originally available on the Microphone, Group and Main Cassettes of the historic EMI TG12345 desks; the boost or cut control was a rotary switch.

## EQ In

The toggle switch labeled *EQ IN*, when positioned downward, inserts the *Curve Bender* into the audio path; conversely, in the upward position, the equalizer section is bypassed.

## Output

The *Output* control is continuous, acting as a fader would on a mixing console. Use this control to trim the overall output level of the Pre Amp/EQ section to a recording device, converter or interface, external equipment, or to regulate level sent into the TG1 Opto compressor when patched as part of the cassette chain.



**Note:** When setting Pre Amp/EQ section input gain, begin with the *Output* control set fully clockwise (10) for unity level, adjust anticlockwise as needed so as not to clip the targeted device's input.

**Tip:** If extra coloration or harmonic distortion is desired, this may be achieved by means of overdriving the Pre Amp/EQ input stage as follows- begin with the *Output* control lower, adjust *Coarse Gain* considerably higher, and tune *Fine Gain* to satisfaction.



## TGI OPTO



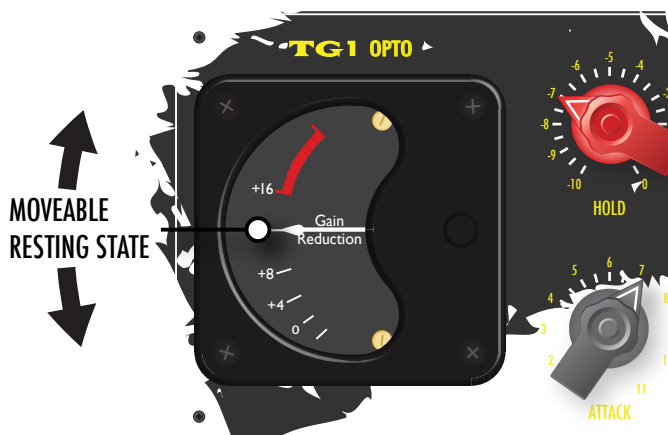
It is little known that EMI technical engineers experimented with *opto* detection in their compression circuits. The *TGI Opto* is an opto adaptation of Chandler Limited's TGI Limiter, a recreation of the limiters found in the historic EMI TG12345 recording consoles and TG12410 transfer desks of the late '60s and '70s.

Historically referred to as a *level back-off* system, in a modern context, the TGI Opto compressor should be considered a dynamic range reducer, that is- it attenuates transient peaks while simultaneously amplifying quieter signals.

### Important Notes on Use

A unique feature of this compressor is the inactive state gain level - when at rest between compression cycles - as indicated on the *Gain Reduction* meter when in bypass, can be preset by means of the *Hold* control. An important benefit of this moveable resting state is, a better signal/noise ratio can be realized.

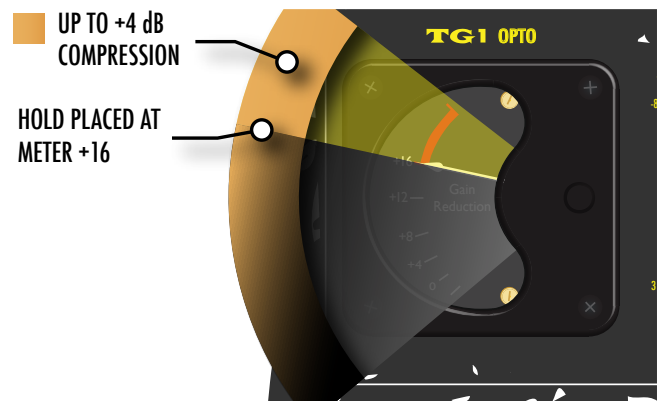
The key towards optimal employment of the TGI Opto compressor is, understanding the *Gain Reduction* meter and *Hold* control, without signal present.



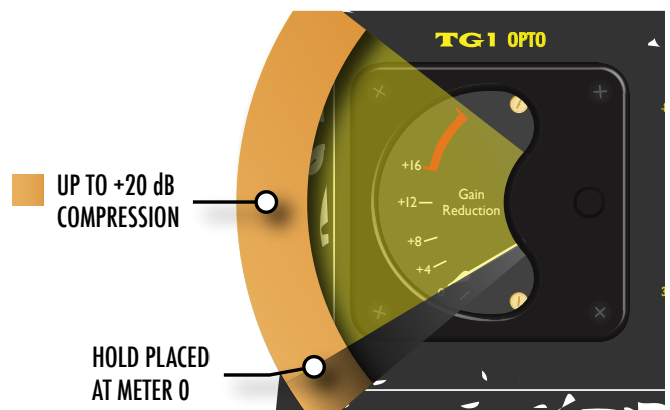
The meter scale range begins below 0 and extends to +20 at the end of the red region.

The degree of compression available is relative to the position of the meter needle from the top of the scale and calculated as the difference thereof:  $+20 - X \text{ needle position} = Y \text{ compression}$ .

For example, with the compressor in bypass, positioning the meter needle by means of the *Hold* control to +16 on the scale, will provide up to +4 dB of compression.



Adjusting the *Hold* control anticlockwise, and placing the meter needle at 0 on the scale will provide up to +20 dB of available compression.



**Note:** Placing the needle below meter 0 will allow maximum possible reduction and set the inactive state gain to its highest level.

**Tip:** Positioning of the needle between +8 and +12 on the meter scale, can be a great starting point for most sources.

## Hold

The *Hold* control is continuous and used to set the desired degree of compression, a setting of 0 is least and -10 is maximum potential reduction.

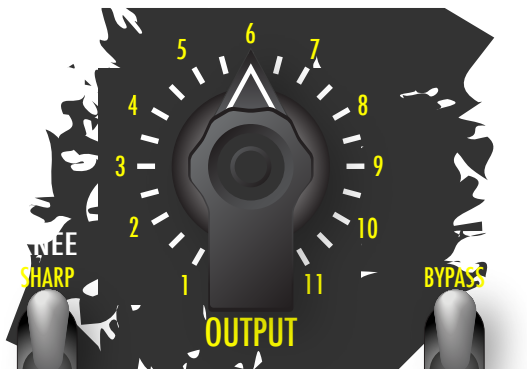


**Note:** The *Hold* control works independently of level applied to the compressor, i.e. regardless of where the meter needle is placed, the hotter the input signal into the TGI Opto is, the greater the rate of compression be.

**Tip:** To cope with inconsistent peak level programme, set the *Hold* control fully anticlockwise (-10), and send lower level signal into the compressor, gradually increase the source until the desired amount of compression is achieved; adjust the TGI Opto *Output* control — described in the next section — to make up any gain lost.

## Output

Provision is made for makeup gain by means of the compressor's *Output* control. This control is continuous and used to return compressed programme to level; anticlockwise rotation is less makeup gain.



**Note:** The more compressed programme is, the louder the processed material may appear, thus necessitating reduction of the compressor's *Output* control.

## Attack

This is a continuous control and is used to set the speed at which compression is onset.



**Historical note:** EMI limiters including the: RS114 tube limiter, RS124 Compressor, RS168 Zener prototype, TG12345 recording console limiters, and TG12410 transfer desk limiters had fixed attack times.

## Release

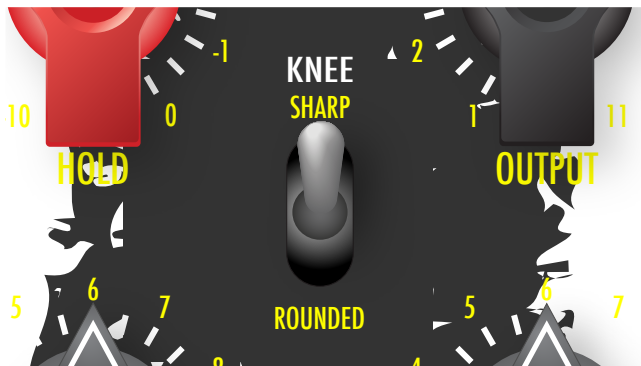
This is a continuous control and is used to set the recovery time from compressed conditions to the inactive state gain level.



**Historical note:** EMI limiters including the: RS114 tube limiter, RS124 Compressor, RS168 Zener prototype, TG12345 recording console limiters, and TG12410 transfer desk limiters had six fixed recovery (release) times.

## Knee

The TGI Opto provides two compression knee types: Sharp and Rounded.



### Sharp knee

*Sharp* is equivalent to limit mode on the TGI and Zener Limiters, and is considered hard. When the Knee switch is set to *Sharp*, compression will be full ratio.

**Tip:** Sharp knees are often employed to control transient peaks, while increasing overall programme level.

**Historical note:** On historic EMI TG limiters, *Limit* mode was intended to mimic the curve of the studio's Fairchild 660 units.

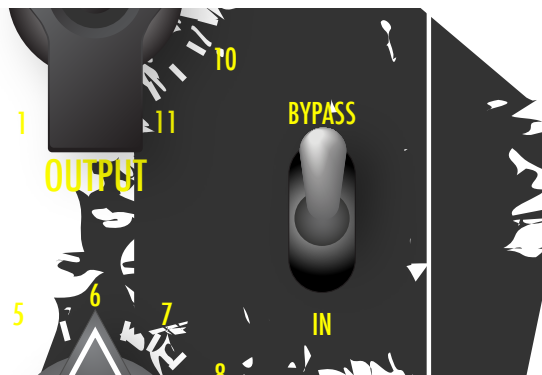
### Rounded knee

*Rounded* is a soft type knee. The traditional soft knee is one in which when triggered, onset of the compression ratio is gradual; however, the soft knee implementation on the TGI Opto functions independently from ratio.

**Tip:** Rounded or soft knees are great in scenarios where compression is required to be less obvious, such as vocals and other melodic source.

## Bypass

When the TGI Opto's Bypass switch is set downward to *IN*, the compressor is active, conversely, when positioned upward, it is removed from the audio path.



**Note:** For the TGI Opto to be active in the TG Microphone Cassette signal chain, it must be physically patched at the rear of the unit, using a short female to male XLR cable (wired pin 2 hot), and connected from the *Pre Amp/EQ* output XLR to the *Compressor* input XLR connector.

## Link Operation

When linked to a second TGI Opto compressor using a standard 1/4" cable via the 1/4" *Link* connector at the rear of the unit, the linked units are controlled by whichever of the two control voltages is instantaneously the greater.

Under linked conditions, each compressor's control set will be managed independently.

Link connector is wired: Tip – CV, Sleeve – 0v.



**Note:** When using the TGI Opto independently of a second unit or in mono, be sure to remove any link cable as to not cause undesired influence of one another.

## **SERVICE**

### **United States**

Prior to sending in equipment for repair, please contact our shop at the number below. We will assist you in troubleshooting, and if needed, we will issue an RMA# to return the equipment for service.

### **Send Repairs To:**

Chandler Limited, Inc.

Attention: Repairs

222 S. Cherry St.

PO Box 38 (if sending via the postal service)

Shell Rock IA 50670

Phone: (319) 885-4200

Email: [support@chandlerlimited.com](mailto:support@chandlerlimited.com)

### **International**

Repair of Chandler Limited products purchased, outside of the United States, is provided by local or regional authorized Chandler Limited distributors. To obtain service or repairs, please contact your local dealer or regional distributor for further instruction.

Visit [chandlerlimited.com](http://chandlerlimited.com) for a list of authorized [International Distributors](#).

## **CE CERTIFICATION**

Chandler Limited declares under its sole responsibility that all products manufactured by them are in compliance with Electromagnetic Compatibility (EMC) Directive 2014/30/EU; Standards: EN55103-1:2009+A1:2012; EN55103-2:2009; EN55013:2013 and Low Voltage Directive (LVD) 2014/35/EU; Standards: EN60065:2002+A1:2006+A11:2008+A2:2010+A12:2011.

## **PRODUCT LIMITED WARRANTY**

During the first year from the date of the original purchase, this product is warranted to be free from defects in materials and workmanship under normal use, service and maintenance. This warranty applies to the original purchaser and is subject to the following terms and conditions:

**What Is Covered:** The product's components as originally installed by the manufacturer that are defective in materials or workmanship under normal use, service and maintenance.

**What Is Not Covered By This Warranty:** This warranty does not extend to or cover:

1. Any defect due to the negligence of others; failure to install, operate or maintain the product properly; unreasonable use; accidents; alteration; use of unauthorized or non-standardized parts; acts of God; theft; vandalism; electrical malfunctions (i.e., resulting from power surges, shorted or overloaded circuits, etc.), use of any power source other than supplied by manufacturer; repair by anyone other than an authorized Chandler Limited representative; or damage resulting from improper packing or mishandling by a shipper.
2. Normal wear and tear of parts.
3. Shipping, handling, packaging and delivery costs of the product.

**Who Is Covered:** The original purchaser.

**Repair During The First Year:** During the first year, all defective product components that are covered by this Limited Warranty will be repaired free of charge including parts and labor. The purchaser will pay shipping costs AND a \$35 handling fee per unit.

**What You Must Do for Warranty Service (in the United States):** If you live in the United States and your product was purchased through a U.S. Dealer, please contact your dealer OR call 319-885-4200 or e-mail [support@chandlerlimited.com](mailto:support@chandlerlimited.com).

**What You Must Do for Warranty Service (outside of the United States):** For warranty service if you live outside of the United States, please contact the dealer where you purchased the product.

Any products returned to Chandler Limited for repair should include: (1) complete description of the problem; (2) name, address, phone number, fax number, and/or e-mail address; (3) receipt of original purchase; (4) power supply and all accessories and cables. The purchaser is responsible for the shipping costs to and from Chandler Limited. Chandler Limited is not responsible for damage resulting from improper packing and/or mishandling by a shipper.

If sent by UPS or Federal Express, ship to: Chandler Limited, 222 South Cherry Street, Shell Rock IA 50670

If sent by Postal Service, ship to: Chandler Limited, PO Box 38, Shell Rock IA 50670

The foregoing expresses Chandler Limited's obligations and liabilities with respect to the quality of the product, its components and accessories. All other warranties, express or implied, including the warranties of merchantability or fitness for a particular purpose are disclaimed. Chandler Limited shall not be liable for the loss or use of the product, its components and accessories, inconvenience, loss or any other damages, direct or consequences arising out of the use of, or inability to use the product or its components or damages resulting from or attributable to defects in the products or its components. No one other than Chandler Limited has authority to extend or modify the terms of this limited warranty in any manner whatsoever.

## **DISCLAIMER OF WARRANTY**

EXCEPT FOR THE FOREGOING WARRANTIES, CHANDLER LIMITED HEREBY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY AND/OR ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND/OR ANY WARRANTY WITH REGARD TO ANY CLAIM OF INFRINGEMENT THAT MAY BE PROVIDED IN SECTION 2-312(3) OF THE UNIFORM COMMERCIAL CODE AND/OR IN ANY OTHER COMPARABLE STATE STATUTE.

## **LIMITATION OF LIABILITY**

THE LIABILITY OF CHANDLER LIMITED, IF ANY, AND PURCHASER'S SOLE AND EXCLUSIVE REMEDY FOR DAMAGES FOR ANY CLAIM OF ANY KIND WHATSOEVER, REGARDLESS OF THE LEGAL THEORY AND WHETHER ARISING IN TORT OR CONTRACT, SHALL NOT BE GREATER THAN THE ACTUAL PURCHASE PRICE OF THE PRODUCT WITH RESPECT TO WHICH SUCH CLAIM IS MADE. IN NO EVENT SHALL CHANDLER LIMITED BE LIABLE TO PURCHASER FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION, REIMBURSEMENT OR DAMAGES ON ACCOUNT OF THE LOSS OF PRESENT OR PROSPECTIVE PROFITS OR FOR ANY OTHER REASON WHATSOEVER.