



# N390 Series RF Drivers

## FPS Guidance Notes

### Introduction

When Q-Switching lasers at high repetition rates, it is normal to observe a giant first pulse after a pause in operation. For many applications this excess energy must be dissipated before or during the next modulation cycle. For example, in laser markers, when the time taken for the scanning head to move to a new location exceeds the repetition rate, the next mark can be more intense and hence may appear inconsistent or even result in damage to the substrate.

The N390 series RF driver can be manufactured with any one of four pulse control options. A Gooch & Housego engineer can help you specify the type you require at the time of placing your order.

First Pulse Suppression Options	
<b>FPS (First Pulse Suppression)</b>	A TTL input triggers automatic ramping of the 'RF off level' allowing controlled release of the first pulse whilst materials processing.
<b>PPK (Pre-Pulse Kill)</b>	A TTL input triggers automatic ramping of the 'RF off level' allowing controlled release of the first pulse prior to materials processing.
<b>RF Off Analogue Control (R05)</b>	Manual control of the 'RF off level' (1-5V) allows controlled release of the first pulse whilst materials processing.
<b>Analogue Modulation (A05 or A13)</b>	Complete manual control of the RF level (0-5V or 2-13V) allows for PPK or FPS type suppression. (This option has certain requirements from your analogue voltage)



# N390 Series RF Drivers

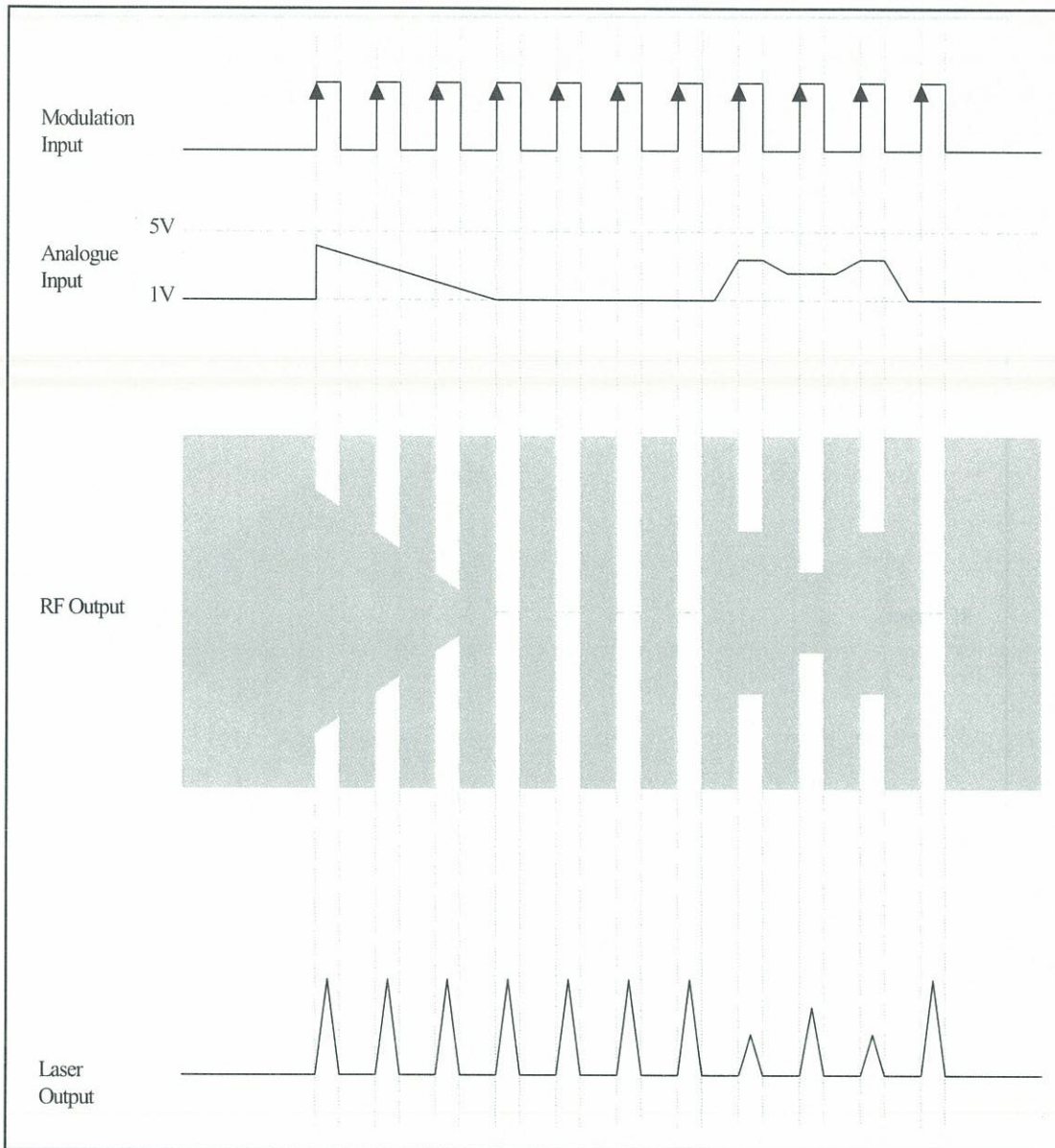
## FPS Guidance Notes

### RF Off Analogue Control (R05)

This method enables full manual control of FPS using an analogue input to control the RF off level by ramping the voltage at the beginning of the pulsed laser output.

This function can also be used to control the laser pulse power as illustrated.

Between 0 and 1V, the RF off level is zero. From 1 to 5V the RF level varies from zero to full power.



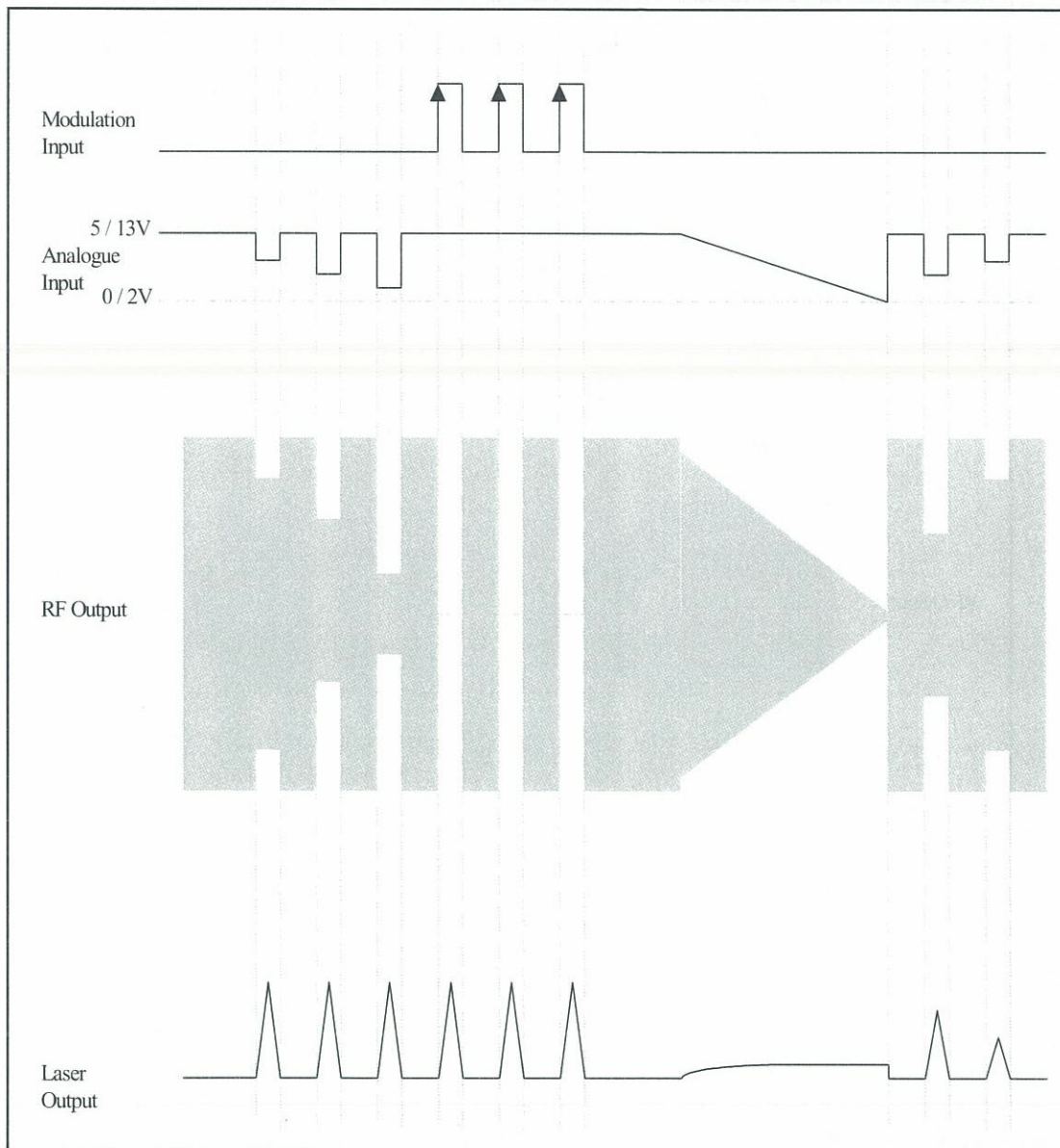
# N390 Series RF Drivers

## FPS Guidance Notes

### Analogue Modulation (A05 / A13)

An analogue input enables manual control of the RF power output, allowing FPS type suppression by modulating and ramping the voltage simultaneously, or PPK type suppression by simply ramping the voltage between modulation pulse trains. Additionally, this control input can be used to vary the laser pulse power level.

This option is available as either 0 to 5V (A05) or 2 to 13V (A13). Note that TTL modulation cannot be applied at the same time as the analogue input.



光技術をサポートする  
株式会社オプトサイエンス  
<http://www.optoscience.com>

東京本社 〒160-0014 東京都新宿区内藤町1番地 内藤町ビルディング  
TEL:03(3356)1064 FAX:03(3356)3466 E-mail:info@optoscience.com  
大阪支店 〒532-0011 大阪市淀川区西中島7-7-2 新大阪ビル西館  
TEL:06(6305)2064 FAX:06(6305)1030 E-mail:osk@optoscience.com  
名古屋営業所 〒450-0002 名古屋市中村区名駅2-37-21 東海ソフトビル  
TEL:052(569)6064 FAX:052(569)8064 E-mail:ngo@optoscience.com

# N390 Series RF Drivers

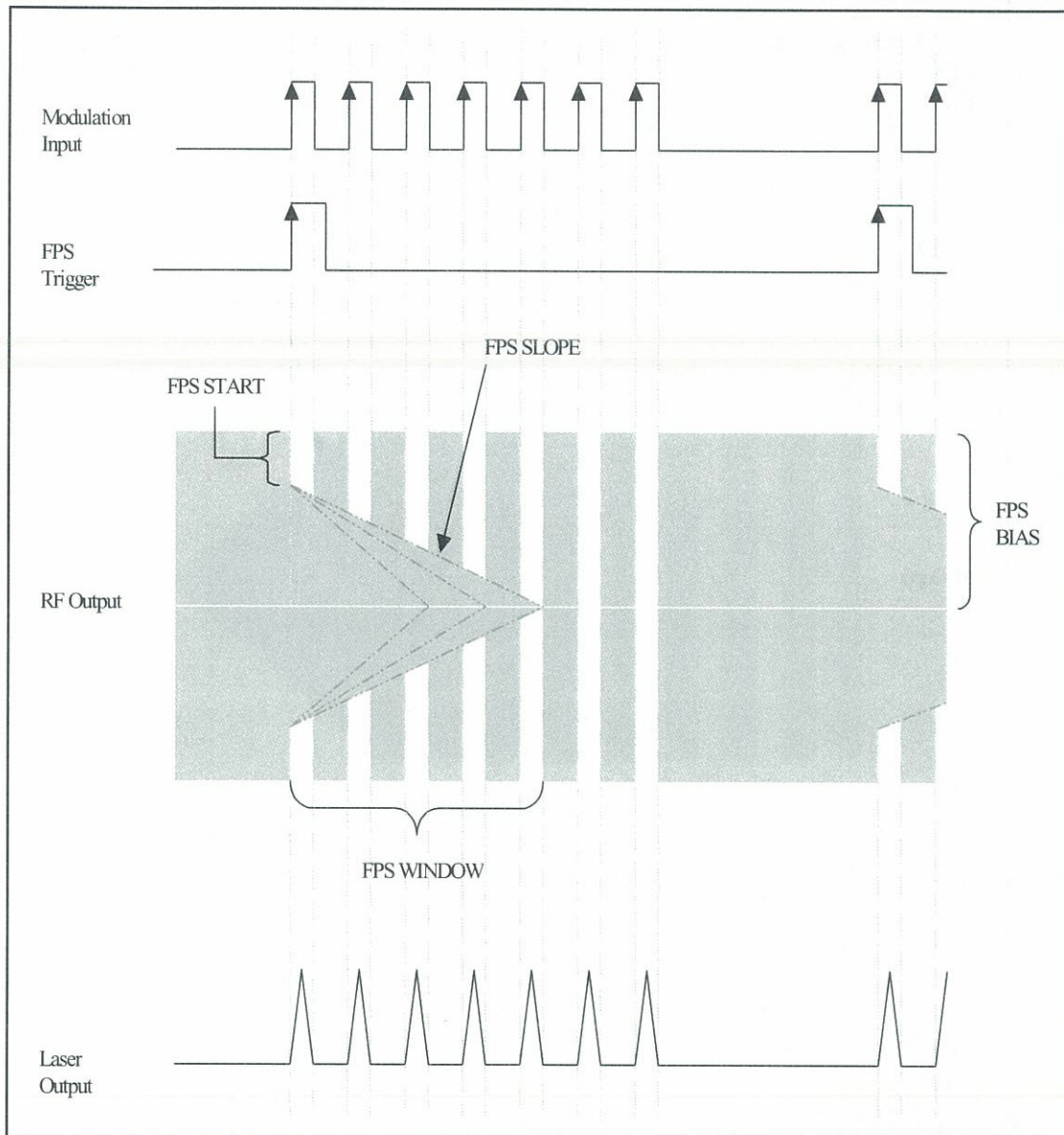
## FPS Guidance Notes

### First Pulse Suppression (FPS)

With this method, the excess energy of the giant first pulse is dissipated within the first few laser pulses.

To enable this, a TTL input (FPS trigger) must be provided at the start of the modulation cycle, triggering an automatic RF power ramp. The shape of the ramp is manually adjustable using a series of trimpots onboard the driver.

Note: FPS is a patented technique, for which G&H license US patent #4,675,872.



# N390 Series RF Drivers

## FPS Guidance Notes

### Pre-Pulse Kill (PPK)

With this method, the excess energy of the giant first pulse is dissipated before pulsed laser output begins.

To enable this, a TTL input (PPK trigger) must be provided in advance of the modulation cycle, triggering an automatic RF power ramp. The shape of the ramp is manually adjustable using a series of trimpots onboard the driver.

