

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CAMBRIDGE INDUSTRIES USA, INC.,

Petitioner

v.

APPLIED OPTOELECTRONICS, INC.,

Patent Owner

Case: IPR2025-00437

U.S. Patent No. 10,788,690

**PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE TO
PETITION FOR *INTER PARTES* REVIEW**

Mail Stop PATENT BOARD
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
PO Box 1450
Alexandria, Virginia 22313-1450

TABLE OF CONTENTS

	<u>Page</u>
TABLE OF EXHIBITS	1
I. INTRODUCTION	2
II. NO DISPUTES REGARDING A POSITA OR CLAIM CONSTUCTION	2
III. PATENT OWNER CONCEDES CLAIMS 1-10 ARE UNPATENTABLE.....	3
IV. CLAIMS 11-19 ARE UNPATENTABLE	4
A. Xiong Teaches Features that Patent Owner’s Expert, Dr. Willner, Readily Admits Were Known in the Art	5
B. Patent Owner’s Misconception of Xiong’s Relevance	7
C. The Wang-Xiong Combination Discloses All of the Limitations of Claim 11	11
D. Patent Owner Offers No Further Argument For Claims 12-19	12
V. DR. WILLNER’S TESTIMONY IS UNRELIABLE	12
VI. CONCLUSION.....	14
CERTIFICATION UNDER 37 C.F.R. § 42.24.....	15
CERTIFICATE OF SERVICE.....	16

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>In re Magnum Oil Tools Int’l, Ltd.</i> , 829 F.3d 1364 (Fed. Cir. 2016)	4, 12
<i>In re NuVasive, Inc.</i> , 842 F.3d 1376 (Fed. Cir. 2016)	3, 12

TABLE OF EXHIBITS

Exhibit	Short Name	Description
Ex. 1001	'690 Patent	U.S. Patent No. 10,788,690
Ex. 1002	'690 Patent File History	File History of U.S. Patent No. 10,788,690
Ex. 1003	Kirk Declaration	Expert Declaration of Dr. Andrew G. Kirk
Ex. 1004	Kirk CV	<i>Curriculum Vitae</i> of Dr. Andrew G. Kirk
Ex. 1005	Wang	Chinese Patent No. 208421455U
Ex.1006	—	Wang English translation
Ex. 1007	Hata	U.S. Patent App. Pub. No. US 2003/0053208 A1
Ex. 1008	Xiong	U.S. Patent No. 9,563,073
Ex. 1009	Yoshie	U.S. Patent App. Pub. No. US 2010/0002988A1
Ex. 1010	Ye	U.S. Patent App. Pub. No. US 2014/0146389A1
Ex. 1011	Scheduling Order	Doc. No. 30, Scheduling Order, <i>Applied Optoelectronics, Inc. v. Cambridge Industries USA, Inc.</i> , No. 3:24-cv-01010-JD (N.D. Cal.)
Ex. 1012	Pisano Declaration	Declaration of Nicola A. Pisano collecting exemplary Stay Orders entered by Judge Haywood Gilliam and Data Showing Success Rates for Motion to Stay
Ex. 1013	Interim Process FAQs	FAQs for Interim Processes for PTAB Workload Management
Ex. 1014	Willner Deposition	Transcript of the Feb. 19, 2026, Deposition of Dr. Alan Willner

I. INTRODUCTION

Patent Owner does not deny that Wang¹ anticipates claims 1-10 of the '690 patent, rendering those claims unpatentable. The Board need not expend any further time to render its decision on those claims.

Patent Owner's response as to claims 11-19 rests on Patent Owner's misconception of the Petitioner's obviousness argument based on Wang and Xiong, Ex. 1008. Petitioner cites to the "Background" section of Xiong to demonstrate that it was well known in the art to have an optical transceiver in which a laser diode is aligned with an optical isolator, as shown in *the prior art* of FIG. 1 of Xiong, reproduced at page 27 of the Petition. Rather than consider the invalidating combination of Wang and *the prior art* discussed in Xiong, Patent Owner argues that the opto-isolator of Wang could not be used with the *specific* spot size converter disclosed in Xiong to invalidate claims 11-19. Patent Owner misses the forest for the trees. Indeed, Patent Owner's own expert acknowledges that all of the elements of claims 11-19 would have been understood to be used with the opto-isolator array of claims 1-10 of Wang.

II. NO DISPUTES REGARDING A POSITA OR CLAIM CONSTRUCTION

The parties agree on the definition of a POSITA. *See* Paper 14. Patent Owner Response to Petition for *Inter Partes* Review of U.S. Patent No. 10,788,690

¹ Terms previously defined in the Petition retain those definitions in this Reply.

(“Response”) at 9. Likewise, the parties are in agreement that no claim construction is necessary and the claim terms should be afforded their plain and ordinary meaning. *Id.* at 9-10.

III. PATENT OWNER CONCEDES CLAIMS 1-10 ARE UNPATENTABLE

The Petition explains in Ground 1 why claims 1-10 are unpatentable as anticipated by Wang. Paper 2, Petition for *Inter Partes* Review Under 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42.104 (“Petition”) at 15-24. Patent Owner acknowledged Petitioner’s explanation. *See* Response at 1 (“In Ground 1, CIG USA challenges claims 1–10 as anticipated by China patent CN 208421455U to Peng Wang”).

Patent Owner offered no rebuttal to Ground 1 and its expert, Dr. Willner, was not asked to – and did not – offer any opinions as to Ground 1. *See* Response *passim*; Exhibit 1014 (Videotaped Videoconference Deposition of Alan E. Willner, Ph.D.), at 13:20-14:12. By failing to challenge the invalidity of claims 1-10 in its Patent Owner’s Response, Patent Owner waived its rights to present further argument on those claims. *In re NuVasive, Inc.*, 842 F.3d 1376, 1380 (Fed. Cir. 2016) (reiterating its holding “that a party waives an argument that it ‘failed to present to the [PTAB]’”) (quoting *In re Watts*, 354 F.3d 1362, 1367-68 (Fed. Cir. 2004)); Paper 12 (Case Management and Scheduling Order 37 C.F.R. § 42.5) at 9 (“Patent Owner is cautioned that any arguments for patentability not raised in the response may be

deemed waived.”); *see also In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1376 n.1 (Fed. Cir. 2016) (while not strictly required to respond to a validity challenge in an IPR, “the patent owner would be well advised to introduce evidence on the asserted challenge”) (internal quotations omitted).

Lacking any rebuttal from Patent Owner, the Board may dispose of claims 1-10 as unpatentable without additional consideration.

IV. CLAIMS 11-19 ARE UNPATENTABLE

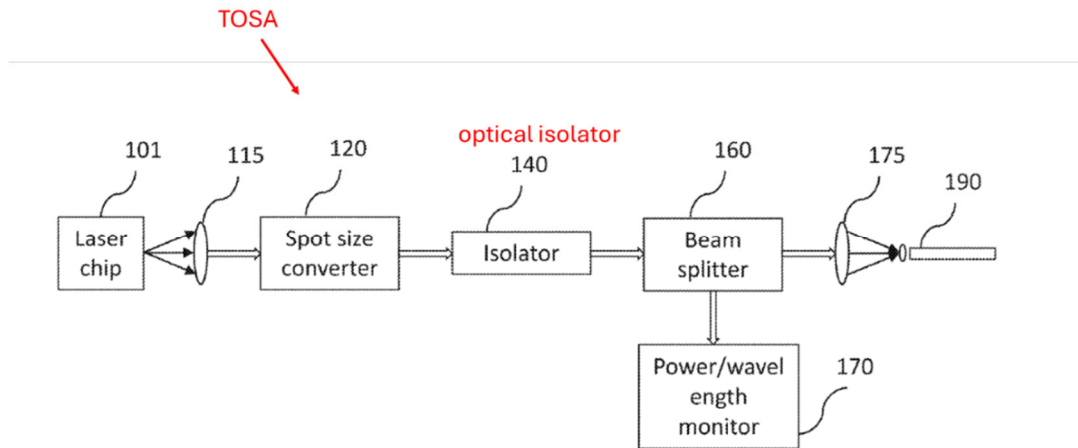
Patent Owner fails to address the arguments set forth in the Petition explaining why claims 11-19 are unpatentable. Instead, Patent Owner sidesteps the obviousness case based on Wang and Xiong by suggesting that a POSITA would not understand how to combine Wang with the specific spot size converter disclosed in Xiong.

Petitioner relied on and cited to *the admitted prior art disclosed in FIG. 1. of Xiong*, which is discussed in the “Background” portion of Xiong (and depicted in FIG. 1) as invalidating claims 11-19 when combined with Wang. Claim 11 adds to the opto-isolator array described in Wang only that 1) Wang would be used with a plurality of laser diodes, 2) that the light paths of the plurality of laser diodes would be aligned with the individual opto-isolators of the array disclosed in Wang; 3) the laser diodes and opto-isolator array would be mounted on a mounting surface; and 4) that the device would be located in a housing. Having conceded unpatentability of claim 1 based on Wang, Patent Owner argues with respect to claims 11-19 that a

POSITA would not have understood how to use the opto-isolator of Wang *for its intended purpose*. But the '690 patent explains that this exact use was well-known in the art at the time the '690 patent was filed. Rather than address this admission, Patent Owner instead focuses on whether Wang could not be used with the *specific* spot size converter disclosed in Xiong.

A. Xiong Teaches Features that Patent Owner's Expert, Dr. Willner, Readily Admits Were Known in the Art

Xiong is cited mostly for its discussion of prior art systems. *See, e.g.*, Petition at 27-30. Specifically, the "Background" portion of Xiong explains that optical transceivers were known and were used to convert between an incoming optical signal and an electrical signal (ROSA) and back to an outgoing optical signal after processing (TOSA). Ex. 1008 at 1:17-19. "In general, an optical transceiver includes a Transmit Optical Subassembly (TOSA), which typically includes a light-emitting device such as a laser chip, and a Receiver Optical Subassembly (ROSA), which typically includes a light-receiving device such as photodiode." *Id.* at 19-23. Xiong notes that a laser diode is a type of a laser chip. *Id.* at 1:41 ("laser chip (e.g., a laser diode)"). The well-known optical transceiver systems described in Xiong may also include a collimating lens disposed between the laser chip (laser diode) and the optical isolator. *Id.* at 24-39. Xiong further illustrates an example of this prior art system:



Ex. 1008, FIG. 1 (annotated)

Dr. Willner agreed that for the prior art system depicted and described in relation to Figure 1 of Xiong, a POSITA would know that the laser chip would need to be optically aligned with the isolator. Ex. 1014 at 65:2-20 (“... The light coming out of the single laser chip passing through the lens and the spot-size converter and the isolator, a person of ordinary skill would know that it would likely need to be aligned”). Moreover, those components would need to be mounted in some fashion to maintain that optical alignment. Ex. 1014 at 65:21-66:23 (“... the light would likely need to be aligned amongst those components and also held in place in some fashion, such that the alignment can be maintained”).

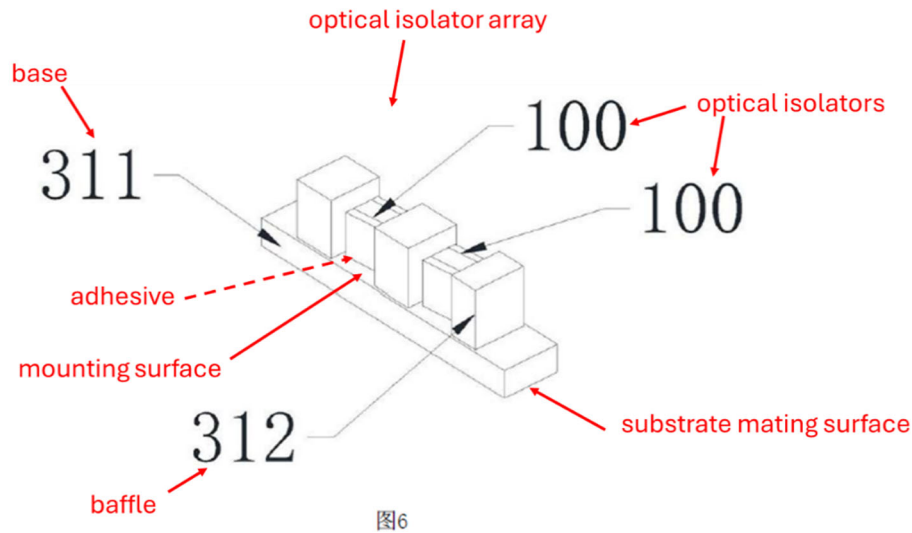
The '690 patent itself also discloses that these features were well-known in the art, even for multi-channel TOSAs. Specifically, the “Background Information” section of the '690 concedes that known prior art TOSAs have “a plurality of laser arrangements including, for example, a laser diode driver (LDD), laser diode, focus

lens and multiplexer device, and a multiplexing device for combining channel wavelengths from each of the plurality of laser arrangements in a single housing.” Ex. 1001 at 1:29-35. The ’690 patent further discloses that in those known prior art TOSAs, “[e]ach component of the TOSA *must* be securely attached and optically aligned with other associated optical components.” Ex. 1001 at 1:35-37 (emphasis added); Ex. 1014 at 32:5-33:2 (the Background section of the ’690 patent addresses prior art).

B. Patent Owner’s Misconception of Xiong’s Relevance

Ignoring Petitioner’s reliance on prior art discussion of Xiong, Patent Owner instead focuses on the inventive aspects of Xiong which Patent Owner claims are incompatible with the opto-isolator array of Wang. Patent Owner characterizes Xiong as being “directed to a combined splitter, isolator, and spot-size converter for use with a single channel,” and elaborates on the details of the three embodiments taught by Xiong. Response at 5-8. At no point in the Response does Patent Owner acknowledge that the prior art systems of FIG. 1 of Xiong teaches all of the elements recited in claim 11, which plainly must be replicated for multiple channels to employ the *array* of opto-isolators disclosed in Wang’s multichannel opto-isolator array.

Wang teaches a multi-channel opto-isolator as shown below:



Ex. 1005, FIG. 6 (annotated)

Petition at 10-11; Ex. 1005; Ex. 1006, ¶¶ [0037]-[0039], FIG. 6.

Patent Owner's expert, Dr. Willner, a person of extraordinary skill in the photonics art (and therefore at least a POSITA) admitted at his deposition the following:

- multi-channel optical transceivers were known in the art prior to alleged invention of the '690 patent (Ex. 1014 at 27:23-28:6 (“multichannel TOSAs were known in the field before ... 2019”), 63:12-21 (“multichannel TOSAs were known”); *see also* Ex. 1001 at 1:15-43 (describing known prior art multi-channel TOSAs));
- the previously known multi-channel optical transceivers included a TOSA and a ROSA capable of handling optical streams of different wavelengths. (Ex. 1014 at 21:21-22:2 (discussing optical transceivers with TOSAs and ROSAs), 32:14-33:2 (the Background section of the

'690 patent addresses prior art); Ex. 1001 at 1:29-35 (describing known prior art multi-channel TOSAs));

- as taught in FIG. 1 of Xiong, the light path emitted by the laser diode must be aligned with and intersect the opto-isolator if that device is to have any purpose (Ex. 1014 at 65:2-66:23 (“a person of ordinary skill would know that it would likely need to be aligned”); *see also* Ex. 1008 at 1:24-65 (“Each component of the TOSA must be securely attached and optically aligned with other associated optical components....”), FIG. 1);
- the opto-isolator array of Wang and the plurality of laser diodes used with that array must be mounted on something to maintain alignment therebetween, as opposed to floating loose in a bag (Ex. 1014 at 24:25-26:25, 28:25-29:16, 32:14-33:2; Ex. 1001 at 1:29-37); and
- optical transceivers are always packaged in a housing (Ex. 1014 at 23:9-15, 32:14-33:2; Ex. 1001 at 1:29-35).

The foregoing admissions demonstrate that a POSITA, given the opto-isolator array of Wang, would have found the recitations of claim 11 entirely obvious in view of the teaching of Xiong (and the admissions regarding prior art in the '690 patent) that (1) transceivers having a TOSA and ROSA were known, and (2) a laser diode must be mounted on a surface so that its light path is aligned with and intersects the opto-

isolator. *See* Ex. 1001 at 1:15-37. A POSITA further would have understood that for a multichannel device as described in Wang, the arrangement of the prior art FIG. 1 of Xiong would be replicated for each opto-isolator in the array. *See, e.g.,* Ex. 1014 at 28:7-29:16 (“a TOSA ... could have had multiple lasers, multiple lenses, multiple isolators that were aligned, and that would have been mounted such that the alignment would be maintained”).

Patent Owner’s Response ignores the obvious, and instead argues that none of the three *specific* embodiments taught by Xiong supplies the elements missing from Wang, and accordingly, a POSITA would not have been motivated to combine Wang with Xiong. Response at 10-16. The Board, however, need not follow Patent Owner down that rabbit hole. Instead, because all of the other components of claim 11 (and indeed dependent claims 12-19) were known in the prior art, as admitted by Dr. Willner, a POSITA plainly would have been motivated to employ those known components (a plurality of laser diodes, a mounting surface and a housing) with the opto-isolator of Wang precisely for the reasons that Wang was created in the first place – to save space within a housing in a multi-channel device. *See, e.g.,* Exhibit 1006, Abstract (“The present utility model relates to the field of isolators, and specifically to a multi-channel isolator device... by designing a multi-channel isolator device and rationally designing a magnetic block, the overall space requirement of the multi-channel isolator is reduced and the spacing accuracy

between isolators is improved.”)

Patent Owner fails to address the obviousness of claims 11-19 in view of the combination of Wang with the admitted prior art disclosed in FIG. 1 of Xiong that Petitioner relies on to demonstrate that all elements of claims 11-19 are taught in Xiong and Wang, and would have been completely obvious to a POSITA well before that alleged invention of the '690 patent.

C. The Wang-Xiong Combination Discloses All of the Limitations of Claim 11

As explained in the Petition, the “Background” section of Xiong discusses admitted prior art optical transceivers have TOSAs that include laser diodes, as exemplified by FIG. 1 of Xiong. Petition at 28 (citing Ex. 1008, FIG. 1, 1:24-65); *see also* the '690 patent, Ex. 1001 at 1:15-37. When the correct combination is considered for invalidity purposes (i.e., Xiong’s prior art of FIG. 1), it is plain that a POSITA would readily been motivated to incorporate that structure to utilize the multichannel opto-isolator disclosed in Wang. *See* Petition at 28; Ex. 1003, ¶¶ 99 (“a POSITA would have understood that the optical isolator array of Wang could successfully be employed in a TOSA and optical transceiver, as exemplified by Xiong”), 104; Ex. 1001 at 1:35-37 (explaining that in known prior art optical transceivers, “[e]ach component of the TOSA must be securely attached and optically aligned with other associated optical components”). Patent Owner does not address this combination, nor does the Response even acknowledge that Wang

discusses a multichannel opto-isolator that inherently would have been understood by a POSITA to be used with multiple lasers, instead leaving those invalidity arguments unchallenged. *See In re NuVasive*, 842 F.3d at 1380; Paper 12 at 9; *see also In re Magnum Oil Tools*, 829 F.3d at 1376 n.1.

Patent Owner has not challenged the combination of Wang and the prior art system discussed in Figure 1 of Xiong that was set forth in the Petition, which combination meets all the elements of claim 11.

D. Patent Owner Offers No Further Argument For Claims 12-19

Claims 12-19 depend from independent claim 11. The Petition explains why claims 12-19 are invalid in light of the prior art. Paper 2 at 30-32. Patent Owner did not offer any response or rebuttal to counter Petitioner's explanation of invalidity of claims 12-19 apart from its arguments regarding claim 11. Response at 19-23. Accordingly, claims 12-19 are invalid for the reasons set forth in the Petition and Dr. Willner's deposition testimony for claim 11.

V. DR. WILLNER'S DECLARATION IS UNRELIABLE

Dr. Willner could not articulate the basis for his written opinions, as opposed to the admissions made during his deposition discussed above. For example, in his declaration, Dr. Willner purported to have considered the limitations of claim 11 and what a POSITA would have understood the terms of that claim to mean. Ex. 1014 at 37:16-20. But during his deposition, he was repeatedly unable to explain what the

terms of claim 11 would have meant to a POSITA. *See, e.g.*, Ex. 1014 at 36:15-41:13 (unable to articulate the meaning of “at least one mounting surface” in claim 11).²

Dr. Willner was also evasive in his deposition where he either testified differently than his earlier declaration or lacked a basic understanding of the relevant technology to qualify as a POSITA. For example, the '690 patent defines a “TOSA” as a “transmitter optical subassembly.” Ex. 1001 at 4:15-20. Dr. Willner’s declaration and Patent Owner’s Response also use the same definition. Ex. 2004 at ¶ 55; Paper 14 at 3. But when Dr. Willner was asked about a TOSA in his deposition, the following exchange occurred:

- Q. And you earlier said TOSA was an acronym, correct? Do you recall that?
- A. TOSA is often used as an abbreviation.
- Q. What does the A stand for in that abbreviation?
- A. I would have to – I’d have to remember accurately what it is.
- Q. ... Please tell me what TOSA stands for, if you know. If you don't know, tell me that too.
- A. TOSA is often -- people discuss it in terms of a transmitter optical subassembly. And the '690 is talking about a TOSA. Whatever the A is standing for, TOSA arrangement, there’s a second A, right, there’s an arrangement.
So it’s a TOSA. Whatever that A is with another word called arrangement.

Ex. 1014 at 20:4-21:2. But, the device is a “TOSA” not a “TOSAA” and there is no

² Additionally, while Dr. Willner’s declaration purported to offer his “Qualifications, Publications, and Prior Testimony,” no such prior testimony was identified. Ex. 2004 at 5-10; Ex. 1014 at 16:6-17:5.

second “A” in that term, regardless of Dr. Willner’s testimony to the contrary. The ’690 patent makes plain that the “A” in TOSA means “assembly” and does not denote an “arrangement.” *See, e.g.*, Ex. 2004 at ¶¶ 55, 70 (“Xiong does not disclose a TOSA arrangement”); Ex. 1001 at 4:25-30 (referring to a “multi-channel TOSA arrangement”). Dr. Willner’s declaration was not supported by his deposition testimony.

VI. CONCLUSION

Claim 11 is invalid as unpatentable over Wang, the admitted prior art disclosed in FIG. 1 of Xiong, and in view of the admissions of the ’690 patent (and in Dr. Willner’s testimony) regarding what was known in the art prior to the alleged invention of the ’690 patent. Claims 12-19 fall with claim 11, no argument having been offered by Patent Owner regarding why those claims would be patentable separate from claim 11.

The Board should cancel claims all of claims 1-19 as unpatentable.

Date: March 3, 2026

By: /Nicola A. Pisano/

Nicola A. Pisano
Reg. No. 34,408
COZEN O’CONNOR
12255 El Camino Real, Suite 150
San Diego, California 92130
Phone: (619) 685-1714
Fax: (619) 866-6355

CERTIFICATION UNDER 37 C.F.R. § 42.24

Petitioner certifies that the word count in this Petition is 2,864 words, as counted by the word-processing program (Microsoft Word for Office 365) used to generate this Petition, such word count excluding the table of contents, table of authorities, mandatory notices under 37 C.F.R. § 42.8, certificate of service, appendix of exhibits or claim listing, and this certificate of word count. This Petition is in compliance with the 5,600-word limit set in 37 C.F.R. §42.24(c)(1).

Date: March 3, 2026

By: /Nicola A. Pisano/

Nicola A. Pisano
Reg. No. 34,408
COZEN O’CONNOR
12255 El Camino Real, Suite 150
San Diego, California 92130
Phone: (619) 685-1714
Fax: (619) 866-6355

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e), 42.105, the undersigned hereby certifies that true and correct copies of the above-captioned PETITIONER’S REPLY TO PATENT OWNER’S RESPONSE TO PETITION FOR *INTER PARTES* REVIEW and Exhibit 1014 were served in their entireties on March 3, 2026, upon Patent Owner at the correspondence address of record for the subject patent as listed on the USPTO’s Patent Center via Priority Mail Express®:

APPLIED OPTOELECTRONICS, INC.
13115 Jess Pirtle Blvd.
Sugar Land, TX 77478

Date: March 3, 2026

By: /Nicola A. Pisano/

Nicola A. Pisano
Reg. No. 34,408
COZEN O’CONNOR
12255 El Camino Real, Suite 150
San Diego, California 92130
Phone: (619) 685-1714
Fax: (619) 866-6355