

DIRECT WRITE LASER LITHOGRAPHY SYSTEM

NABÍDKA

Uchazeč:

Sídlo:

IČ:

DIČ:

Právní forma:

**Osoba oprávněná
jednat za uchazeče:**

Bankovní spojení:

Číslo účtu:

Kontaktní osoba:

Kontaktní telefon:

Kontaktní email:

OptiXs, s.r.o.

Křivoklátská 37/3, 199 00 Praha 9

020 16 770

CZ02016770

společnost s ručením omezeným

Ing. Martin Klečka, jednatel

Československá obchodní banka, a.s.

269060882/0300

Ing. Martin Klečka

+420 607 014 278

klecka@optixs.cz

Annex No. 1

Bid Cover Note

BASIC DATA:

Public Tender Title: Direct Write Laser Lithography System

Contracting Authority: Institute of Photonics and Electronics of the Czech Academy of Sciences, public research institution
Registered office: Chaberská 57, 182 51 Praha 8 - Kobylisy
Id. No.: 67985882
Person authorized to represent the Contracting Authority: Prof. Ing. Jiří Homola, CSc., DSc., Director

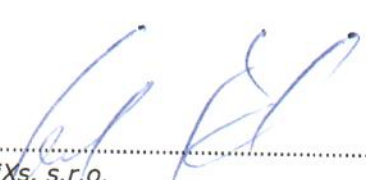
Tenderer: OptiXs, s.r.o.
Registered office: Křivoklátská 37, 199 00 Praha 9
Id. No.: 02016770
Tax Id. No.: CZ02016770
Person authorized to represent the bidder: Ing. Martin Klečka, CEO
Bank: Československá obchodní banka, a.s.
Contact person: Ing. Martin Klečka
Contact address: Křivoklátská 37, 199 00 Praha 9
Tel: +420607014278 **E-mail of the Contact Person:** klecka@optixs.cz

Data relevant for purposes of evaluation:

Total bid price in CZK excluding VAT: 4 099 500,-

Total bid price in CZK including VAT: 4 960 395,-
(not applicable for foreign bidders)

In Prague on 13.4.2016


.....
OptiXs, s.r.o.
Ing. Martin Klečka, CEO

OptiXs s.r.o.
Křivoklátská 37, 199 00 Praha 9
IČ: 02016770 DIČ: CZ02016770
www.optixs.cz

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Základní informace o uchazeči o veřejnou zakázku

Veřejná zakázka: Direct write laser lithography system

Uchazeč:

Obchodní název:

OptiXs, s.r.o.

Sídlo:

Křivoklátská 37/3, 199 00 Praha 9

IČ:

020 16 770

DIČ:

CZ02016770

Právní forma:

společnost s ručením omezeným

Osoba oprávněná

jednat za uchazeče:

Ing. Martin Klečka, jednatel

Kontakt:

+420 607 014 278

Bankovní spojení:

Československá obchodní banka, a.s.

Číslo účtu:

269060882/0300

Kontaktní osoba:

Ing. Martin Klečka

Kontaktní telefon:

+420 607 014 278

Kontaktní email:

klecka@optixs.cz

Profil společnosti:

Společnost OptiXs, s.r.o. se zabývá komplexními dodávkami přístrojové techniky pro vysoce přesnou metrologii a výzkum od předních světových výrobců.

Díky odborným znalostem našich pracovníků jsme schopni poskytnout služby začínající formou poradenství, dodáním systému a končící dlouhodobou údržbou zařízení a aplikační podporou.

Annex No. 2

Affidavit pursuant to Sec. 62 (3) of the Act

Pursuant to Act No. 137/2006 Coll., on Public Contracts, as amended
(hereinafter referred to as the "Act")

Public Tender Title:	Direct Write Laser Lithography System
Business name of the bidder (incl. legal form)	OptiXs, s.r.o.
Seat / place of business	Křivoklátská 37, 199 00 Praha 9
ID	02016770
Tax ID	CZ02016770

I hereby solemnly declare, that

With reference to Sec. 62 (3) of the Act: Bidder fulfils the basic qualification criteria pursuant to art. 3.3 of the Tender Documentation to the Tender called: **Direct Write Laser Lithography System** and shall, prior to concluding the contract, submit an original of the Affidavit issued in line with Sec.62(2) of the Act.

With reference to Sec. 62 (3) of the Act: Bidder fulfils the professional qualification criteria pursuant to art. 3.4 of the Tender Documentation to the Tender called: **Direct Write Laser Lithography System** and shall, prior to concluding the contract, submit an original or officially verified copies of all required documents pursuant to requirements defined in the Tender Documentation.

With reference to Sec. 62 (3) of the Act: Bidder fulfils the technical qualification criteria pursuant to art. 3.5 of the Tender Documentation to the Tender called: **Direct Write Laser Lithography System** and shall, prior to concluding the contract, submit an original or officially verified copies of all required documents pursuant to requirements defined in the Tender Documentation.

In Prague on 13.4.2016


.....
OptiXs, s.r.o.
Ing. Martin Klečka, CEO

OptiXs s.r.o.
Křivoklátská 37, 199 00 Praha 9
IČ: 02016770 DIČ: CZ02016770
www.optixs.cz



Výpis ze seznamu kvalifikovaných dodavatelů vygenerovaný informačním systémem o veřejných zakázkách

Výpis ze seznamu kvalifikovaných dodavatelů

vedeného podle § 125 a násled. zákona č. 137/2006 Sb., o veřejných zakázkách, ve znění pozdějších předpisů

Údaje o dodavateli zapsané v seznamu k 06.04.2016

1. Identifikační údaje o dodavateli

1.1. Obchodní firma/Název

OptiXs, s.r.o.

1.2. Právní forma

Společnost s ručením omezeným

1.3. Sídlo

Křivoklátská 37/3

19900 Praha Letňany

Česká republika

1.4. IČO

02016770

1.5. Statutární orgán

Jméno a příjmení statutárního orgánu nebo jeho členů	Funkce ve statutárním orgánu
Ing. Aleš Jandík	jednatel
Ing. Martin Klečka	jednatel

Způsob a rozsah jednání

Jednatel jedná jménem společnosti samostatně.

2. Základní kvalifikační předpoklady, jejichž splnění dodavatel prokázal

Dodavatel prokázal ministerstvu pro místní rozvoj v souladu s ustanovením § 53 odst. 3 zákona, že:

- § 53 odst. 1 písm. a)
nebyl pravomocně odsouzen pro trestný čin spáchaný ve prospěch organizované zločinecké skupiny, trestný čin účasti na organizované zločinecké skupině, legalizace výnosů z trestné činnosti, podílnictví, přijetí úplatku, podplacení, nepřímého úplatkářství, podvodu, úvěrového podvodu, včetně případů, kdy jde o přípravu nebo pokus nebo účastenství na takovém trestném činu, nebo došlo k zahlazení odsouzení za spáchání takového trestného činu; jde-li o právnickou osobu, musí tento předpoklad splňovat jak tato právnická osoba, tak její statutární orgán nebo každý člen statutárního orgánu a je-li statutárním orgánem dodavatele či členem statutárního orgánu dodavatele právnická osoba, musí tento předpoklad splňovat jak tato právnická osoba, tak její statutární orgán nebo každý člen statutárního orgánu této právnické osoby; podává-li nabídku či žádost o účast zahraniční právnická osoba prostřednictvím své organizační složky, musí předpoklad podle tohoto písmene splňovat vedle uvedených osob rovněž vedoucí této organizační složky; tento základní kvalifikační předpoklad musí dodavatel splňovat jak ve vztahu k území České republiky, tak k zemi svého sídla, místa podnikání či bydliště.
- § 53 odst. 1 písm. b)
nebyl pravomocně odsouzen pro trestný čin, jehož skutková podstata souvisí s předmětem podnikání dodavatele podle zvláštních právních předpisů nebo došlo k zahlazení odsouzení za spáchání takového trestného činu; jde-li o právnickou osobu, musí tuto podmínku splňovat jak tato právnická osoba, tak její statutární orgán nebo každý člen statutárního orgánu a je-li statutárním orgánem dodavatele či členem statutárního orgánu dodavatele právnická osoba, musí tento předpoklad splňovat jak tato právnická osoba, tak její statutární orgán nebo každý člen statutárního

orgánu této právnické osoby; podává-li nabídku či žádost o účast zahraniční právnická osoba prostřednictvím své organizační složky, musí předpoklad podle tohoto písmene splňovat vedle uvedených osob rovněž vedoucí této organizační složky; tento základní kvalifikační předpoklad musí dodavatel splňovat jak ve vztahu k území České republiky, tak k zemi svého sídla, místa podnikání či bydliště,

- § 53 odst. 1 písm. c)
v posledních třech letech nenaplnil skutkovou podstatu jednání nekalé soutěže formou podplácení podle zvláštního právního předpisu,
- § 53 odst. 1 písm. d)
vůči jehož majetku neprobíhá nebo v posledních třech letech neproběhlo insolvenční řízení, v němž bylo vydáno rozhodnutí o úpadku nebo insolvenční návrh nebyl zamítnut proto, že majetek nepostačuje k úhradě nákladů insolvenčního řízení, nebo nebyl konkurs zrušen proto, že majetek byl zcela nepostačující nebo zavedena nucená správa podle zvláštních právních předpisů,
- § 53 odst. 1 písm. e)
není v likvidaci,
- § 53 odst. 1 písm. f)
nemá v evidenci daní zachyceny daňové nedoplatky, a to jak v České republice, tak v zemi sídla, místa podnikání či bydliště dodavatele,
- § 53 odst. 1 písm. g)
nemá nedoplatek na pojistném a na penále na veřejné zdravotní pojištění, a to jak v České republice, tak v zemi sídla, místa podnikání či bydliště dodavatele,
- § 53 odst. 1 písm. h)
nemá nedoplatek na pojistném a na penále na sociální zabezpečení a příspěvku na státní politiku zaměstnanosti, a to jak v České republice, tak v zemi sídla, místa podnikání či bydliště dodavatele,
- § 53 odst. 1 písm. i)
nebyl v posledních 3 letech pravomocně disciplinárně potrestán či mu nebylo pravomocně uloženo kárné opatření podle zvláštních právních předpisů, je-li podle § 54 písm. d) požadováno prokázání odborné způsobilosti podle zvláštních právních předpisů; pokud dodavatel vykonává tuto činnost prostřednictvím odpovědného zástupce nebo jiné osoby odpovídající za činnost dodavatele, vztahuje se tento předpoklad na tyto osoby,
- § 53 odst. 1 písm. j)
není veden v rejstříku osob se zákazem plnění veřejných zakázek.
- § 53 odst. 1 písm. k)
nebyla mu v posledních 3 letech pravomocně uložena pokuta za umožnění výkonu nelegální práce podle zvláštního právního předpisu.
- § 53 odst. 1 písm. l)
nebyla vůči němu v posledních 3 letech zavedena dočasná správa nebo nebylo vůči němu v posledních 3 letech uplatněno opatření k řešení krize podle zákona upravujícího ozdravné postupy a řešení krize na finančním trhu.

3. Profesní kvalifikační předpoklady, jejichž splnění dodavatel prokázal

3.1 Profesní kvalifikační předpoklady dle ustanovení § 54 písm. a) dodavatel prokázal:

Výpisem z obchodního rejstříku

3.2 Oprávnění k podnikání dle ustanovení § 54 písm. b) dodavatel prokázal:

Název dokladu	Vystavil	Předmět podnikání	Obory činnosti	Datum vystavení	Datum platnosti
Výpis z živnostenského rejstříku	Městská část Praha 18	Výroba, obchod a služby neuvedené v přílohách 1 až 3 živnostenského zákona	Niz. poznámka 1 za tabulkou	06.03.2015	

Výroba měřicích, zkušebních, navigačních, optických a fotografických přístrojů a zařízení
Výroba elektronických součástek, elektrických zařízení a výroba a opravy elektrických strojů, přístrojů
a elektronických zařízení pracujících na malém napětí
Zprostředkování obchodu a služeb
Velkoobchod a maloobchod
Poskytování software, poradenství v oblasti informačních technologií, zpracování dat, hostingové a
související činnosti a webové portály
Poradenská a konzultační činnost, zpracování odborných studií a posudků
Příprava a vypracování technických návrhů, grafické a kresličské práce
Výzkum a vývoj v oblasti přírodních a technických věd nebo společenských věd

4. Datum podání žádosti o zápis do seznamu a jiné důležité informace

Dodavatel podal žádost o zápis do seznamu dne 17.03.2015. Rozhodnutí o zápisu dodavatele do
seznamu nabylo právní moci dne 04.05.2015.
Poslední aktualizace zápisu v seznamu byla provedena dne 10.03.2016.

Správnost tohoto výpisu se potvrzuje
Česká republika - Ministerstvo pro místní rozvoj

Datum: 06.04.2016

Evidenční číslo: CP2016002874



Elektronicky
podepsáno certifikátem
isvz2.mmr.cz
dne 6.4.2016

4

Seznam kvalifikovaných dodavatelů

Ověřuji pod pořadovým číslem **MC18 12840/2016 OKT**, že tato listina, která vznikla převedením výstupu z informačního systému veřejné správy z elektronické podoby do podoby listinné, skládající se z **3** listů, se doslovně shoduje s obsahem výstupu z informačního systému veřejné správy v elektronické podobě.

Ověřující osoba: **Štěpánková Renata**

Praze dne 06.04. 2016

Podpis 



LIST OF IMPORTANT DELIVERIES

Public contract name: DIRECT WRITE LASER LITHOGRAPHY SYSTEM

Contracting authority: Institute of Photonics and Electronics of the CAS, v.v.i.

In order to meet technical qualification criteria we declare, that LOT-QuantumDesign GmbH has implemented following deliveries:

1.

Project name: Direct Write Laser Lithography System MicroWriterII
Contracting authority: Institute of Physics CAS, Na Slovance 1999/2, 182 00 Prague,
Czech Republic
Contact : Ing. Ján Lančok, Ph.D., lančok@fzu.cz, +420 266 052 645
Date of installation: april 2014

2.

Project name: Direct Write Laser Litography System
Contracting authority: Institut für Physikalische Chemie / AK Mews Universität Hamburg
Grindelallee 117
20146 Hamburg
Contact: Dipl.-Ing.(FH) Jan Christian Flügge,
jan.fluegge@chemie.uni-hamburg.de, +49 (0) 40 42838 8279
Date of installation: September 2015

Letters of reference are attached.

In Darmstadt, 05.04.2016

LOT-QuantumDesign GmbH
Im Tüfener Steig 58
D-64293 Darmstadt

Institute of Physics CAS
Na Slovance 1999/2
182 21 Prague 8
Czech Republic

Contact person:
Ing. Ján Lančok, Ph.D.
lancok@fzu.cz
+420 266 052 645

In Prague 7.4.2016

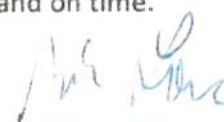
To whom it may concern:

This is to certify that LOT-QuantumDesign GmbH supplied following system:

Direct Write Laser Lithography System MicroWriterII, which can offer following technical specifications :

- Lasers on 375 nm and 405 nm wavelengths
- Working surface 195 mm × 195 mm
- Minimum substrate size $\leq 1 \text{ mm} \times 1 \text{ mm}$
- Maximum substrate size 230 x 230 mm
- Minimum substrate thickness $\leq 0,15 \text{ mm}$
- Maximum substrate thickness 15 mm
- Minimum feature size $\leq 0,6 \mu\text{m}$
- Minimum feature aspect ratio > 10
- Writing speed $\geq 2 \text{ mm}^2/\text{min}$ full-area exposure across 100 mm × 100mm in standard quality raster mode on laser resolution 0,6 μm
- X-Y stage resolution $\leq 1 \mu\text{m}$
- Temperature stabilization of the substrate $\leq \pm 1^\circ\text{C}$
- Optical autofocus
- System for characterization of the surface height (Z coordinate) along X or Y axis (line scan)
- Passive vibration isolation table
- PC for system control (MS windows)
- Software supported DXF format

Installation took place in april 2014 and was done professionally and on time.



Ing. Ján Lančok, Ph.D.
Scientist

Dipl.-Ing.(FH) Jan Christian Flügge
Institut für Physikalische Chemie
AK Mews Universität Hamburg Grindelallee 117
20146 Hamburg

Phone: +49 (0) 40 42838 8279

Fax: +49 (0) 40 42838 7727

Email: jan.fluegge@chemie.uni-hamburg.de

To whom it may concern:

This is to certify that LOT-QuantumDesign GmbH supplied following system:

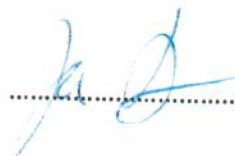
Direct Write Laser Lithography System MicroWriterII, which can offer following technical specifications :

- Lasers on 375 nm and 405 nm wavelengths
- Working surface 195 mm x 195 mm
- Minimum substrate size $\leq 1 \text{ mm} \times 1 \text{ mm}$
- Maximum substrate size 230 x 230 mm
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- Maximum substrate thickness 15 mm
- Minimum feature size $\leq 0,6 \mu\text{m}$
- Minimum feature aspect ratio > 10
- Writing speed $\geq 2 \text{ mm}^2/\text{min}$ full-area exposure across 100 mm x 100mm in standard quality raster mode on laser resolution 0,6 μm
- X-Y stage resolution $\leq 1 \mu\text{m}$
- Temperature stabilization of the substrate $\leq \pm 1^\circ\text{C}$
- Optical autofocus
- System for characterization of the surface height (Z coordinate) along X or Y axis (line scan)
- Passive vibration isolation table
- PC for system control (MS windows)
- Software supported DXF format

Installation took place in 01.09.2015 and was done professionally and on time.

5.9.2015

Date


name

**Declaration pursuant to Section 53 paragraph 1 subparagraph j) of Act No. 137/2006 Coll. on
Public Procurement**

I, the undersigned, hereby declare that LOT-QuantumDesign GmbH is not included in the register
of persons prohibited from being involved in public procurement.

In Darmstadt,.....

.....
LOT-QuantumDesign, GmbH
Dr. Thomas Wagner, ppa Director

LOT-QuantumDesign GmbH
Implem. Sec 58
D-64293 Darmstadt

Handelsregister B des Amtsgerichts Darmstadt	Abteilung B Wiedergabe des aktuellen Registerinhalts Abruf vom 06.04.2016 10:53	Nummer der Firma: HRB 6538
-Ausdruck-	Seite 1 von 2	

1. Anzahl der bisherigen Eintragungen:

4

2. a) Firma:

LOT-QuantumDesign GmbH

b) Sitz, Niederlassung, inländische Geschäftsanschrift, empfangsberechtigte Person, Zweigniederlassungen:

Darmstadt

Geschäftsanschrift: Im Tiefen See 58, 64293 Darmstadt

c) Gegenstand des Unternehmens:

der Handel mit und die Herstellung von wissenschaftlichen Instrumenten, Messgeräten, optischen Produkten, deren Bauteilen sowie sonstiger neuer Technologien.

Grund- oder Stammkapital:

1.000.000,00 EUR

a) Allgemeine Vertretungsregelung:

Ist nur ein Geschäftsführer bestellt, so vertritt er die Gesellschaft allein. Sind mehrere Geschäftsführer bestellt, so wird die Gesellschaft durch zwei Geschäftsführer oder durch einen Geschäftsführer gemeinsam mit einem Prokuristen vertreten.

b) Vorstand, Leitungsorgan, geschäftsführende Direktoren, persönlich haftende Gesellschafter, Geschäftsführer, Vertretungsberechtigte und besondere Vertretungsbefugnis:

Einzelvertretungsberechtigt; mit der Befugnis, im Namen der Gesellschaft mit sich im eigenen Namen oder als Vertreter eines Dritten Rechtsgeschäfte abzuschließen:

Geschäftsführer: Köhler, Ralph, Seeheim-Jugenheim, *17.02.1954

Geschäftsführer: Dr. Schlütter, Jürgen, Bensheim, *23.05.1962

5. Prokura:

Einzelprokura:

Hess, Rainer, Bad König, *28.08.1972

Dr. Pieper, Thorsten, Frankfurt am Main, *20.07.1975

Szemeritsch, Karlheinz, Pfungstadt, *01.03.1960

Dr. Wagner, Thomas, Dieburg, *06.09.1961

Dr. Weiss, Joachim, Fränkisch-Crumbach, *12.11.1960

6. a) Rechtsform, Beginn, Satzung oder Gesellschaftsvertrag:

Gesellschaft mit beschränkter Haftung

Gesellschaftsvertrag vom 29.08.1996

13

Handelsregister B des Amtsgerichts Darmstadt	Abteilung B Wiedergabe des aktuellen Registerinhalts Abruf vom 06.04.2016 10:53	Nummer der Firma: HRB 6538
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Zuletzt geändert durch Beschluss vom 27.09.2012

b) Sonstige Rechtsverhältnisse:

Mit der Quantum Design Europe GmbH, Darmstadt (Amtsgericht Darmstadt, HRB 86148) als herrschendem Unternehmen ist am 11.03.2013 ein Beherrschungs- und Gewinnabführungsvertrag abgeschlossen. Ihm hat die Gesellschafterversammlung vom 28.03.2013 zugestimmt.

7. **a) Tag der letzten Eintragung:**

01.07.2014

Ověřený překlad z německého jazyka

Obchodní rejstřík B Obvodového soudu Darmstadt	Oddíl B Výpis z aktuálního obsahu rejstříku Vyžádáno dne 06.04.2016 10:53	Číslo firmy: HRB 6538
-Výtisk-	Strana 1 ze 2	

1. Počet dosavadních zápisů:

4

2. a) Firma:

LOT-QuantumDesign GmbH

b) Sídlo, závod, tuzemská obchodní adresa, osoba zmocněná k přijímání, pobočky:

Darmstadt

Obchodní adresa: Im Tiefen See 58, 64293 Darmstadt

c) Předmět podnikání:

obchod s a výroba výzkumných nástrojů, měřících přístrojů, optických výrobků, jejich součástí, jakož i ostatních nových technologií

3. Základní nebo kmenový kapitál:

1.000.000,00 EUR

4. a) všeobecné ustanovení o zastupování

Je-li ustanoven pouze jeden jednatel, zastupuje společnost sám. Je-li ustanoveno více jednatelů, je společnost zastupována dvěma jednatelemi nebo jedním jednatelem společně s jedním prokuristou.

b) představenstvo, řídicí orgán, výkonní ředitelé, osobně ručící společníci, jednatelé, osoby oprávněné k zastupování a zvláštní oprávnění k zastupování:

S oprávněním uzavírat právní úkony jménem společnosti se sebou vlastním jménem nebo jako zástupce třetí osoby:

Jednatel: Köhler, Ralph, Seeheim-Jugenheim, *17.02.1954

Jednatel: Dr. Schlütter, Jürgen, Bensheim, *23.05.1962

5. Prokura:

Samostatná prokura:

Hess, Rainer, Bad König, *28.08.1972

Dr. Pieper, Thorsten, Frankfurt nad Mohanem, *20.07.1975

Szemeritsch, Karlheinz, Pfungstadt, *01.03.1960

Dr. Wagner, Thomas, Dieburg, *06.09.1961

Dr. Weiss, Joachim, Fränkisch-Crumbach, *12.11.1960

6. a) právní forma, zahájení, stanovy nebo společenská smlouva: '

společnost s ručením omezeným

společenská smlouva ze dne 29.08.1996

Ověřený překlad z německého jazyka

Obchodní rejstřík B Obvodového soudu Darmstadt	Oddíl B Výpis z aktuálního obsahu rejstříku Vyžádáno dne 06.04.2016 10:53	Číslo firmy: HRB 6538
-Výtisk-	Strana 2 ze 2	

Naposledy změněny rozhodnutím ze dne 27.09.2012

b) ostatní právní vztahy:

Se společností Quantum Design Europe GmbH, Darmstadt (Obvodový soud Darmstadt, HRB 86148) jako ovládající společností byla dne 11.03.2013 uzavřena smlouva o ovládnutí a odvodu zisku, kterou odsouhlasila valná hromada dne 28.03.2013.

7. a) Datum posledního zápisu

01.07.2014

Jako tlumočník jazyka českého, německého a ruského, jmenovaný rozhodnutím Krajského soudu v Praze ze dne 02.02.1999, č.j. Spr 4117/98, stvrzuji, že překlad souhlasí doslovně s textem připojené listiny.

Tlumočnický úkon je zapsán pod poř. číslem 13810/6
.....
tlumočnického deníku.

Als vereidigter Übersetzer und Dolmetscher der tschechischen, deutschen und russischen Sprache, ernannt durch den Bescheid des Bezirksgerichts in Prag vom 02.02.1999, Aktenzeichen Spr. 4117/98, bestätige ich hiermit, daß die Übersetzung mit dem beigefügten Dokument wörtlich übereinstimmt.

Die Dolmetscherleistung ist im Dolmetschertagebuch unter der Ordnungsnummer 13810/6
..... eingetragen.

V Praze dne / Prag, den 8.4.2016
.....



(Otisk razítka)
(Stempelabdruck)

Mgr. Jáchym Košar
Vereidigter Übersetzer und Dolmetscher
der deutschen und russischen Sprache

Košar
.....

Mgr. Jáchym Košar

Kancelář/Büro:

Washingtonova 5, CZ-110 00 Praha 1
Tel.: (+420) 222 250 233

Agreement with a subcontractor to provide performance of the Public Contract

between

LOT-QuantumDesign GmbH

Im Tiefen See 58, 64293 Darmstadt

Deutschland

ID: HRB 6538

and

OptiXs, s.r.o.

Křivoklátská 37, 199 00 Praha 9

Czech Republic

ID: 02016770

The purpose of this agreement is to supply „Direct write laser lithography system“ for Institute of Photonics and Electronics of the Czech Academy of Sciences, public research institution in configuration specified in the Tender Documentation.

Therefore the parties agree to the following:

1. LOT-QuantumDesign GmbH and OptiXs, s.r.o. agree that OptiXs, s.r.o. will act and be responsible as LOT-QuantumDesign's local sales partner for the deal of „Direct write laser lithography system“ for Institute of Photonics and Electronics of the Czech Academy of Sciences, public research institution.

2. OptiXs, s.r.o. shall

- a) sign contract with Institute of Photonics and Electronics of the Czech Academy of Sciences, public research institution
- b) provide adequate and competent technical assistance to enduser,
- c) keep warranty and post warranty support to enduser.

3. LOT-QuantumDesign GmbH agrees to:

- a) supply OptiXs, s.r.o. „Direct write laser lithography system“ in the configuration specified in Tender Documentation.
- b) perform such warranty repairs and service support,
- c) provide OptiXs, s.r.o. at no cost with spare-parts under warranty,

d) provide OptiXs, s.r.o. documentation to fulfill a technical qualification as specified in Tender Documentation

e) provide installation and training pursuant to defined delivery deadlines.

4. Upon termination of this contract LOT-QuantumDesign GmbH will fulfill all obligations under the contract conditions for this supply „Direct write laser lithography system“ for Institute of Photonics and Electronics of the Czech Academy of Sciences, public research institution.

Darmstadt

LOT-QuantumDesign GmbH
Dr. Thomas Wagner, ppa Director

Prague

OptiXs, s.r.o.

Ing. Martin Klečka, CEO

OptiXs s.r.o.

Křivoklátská 37, 199 00 Praha 9
IČ: 02016770 DIČ: CZ02016770
www.optixs.cz

Annex No. 3

Affidavit pursuant to Sec. 68 (3) of the Act

made pursuant to Act No. 137/2006 Coll., on Public Contracts, as amended (hereinafter the "Act")

Public Tender Title:	Direct Write Laser Lithography System
Business name of the bidder (incl. legal form)	OptiXs, s.r.o.
Seat / place of business	Křivoklátská 37, 199 00 Praha 9
ID	02016770
Tax ID	CZ02016770

- 1) We hereby solemnly declare that none of the statutory officers or members of management of the bidder had been, in the last three years prior to the date of submission of our bid, in employment, functional, contractual or other relationship with the Contracting Authority.
- 2) We hereby solemnly declare that we are not a joint-stock company and therefore we cannot present the list of shareholders.
- 3) We hereby solemnly declare, pursuant to Sec. 68 (3) (c) of the Act, that the bidder has not and will not conclude any contract prohibited pursuant to Act No. 143/2001 Coll., on the protection of economic completion, as amended, in connection with the present public contract.

In Prague On 13.4.2016


.....
OptiXs, s.r.o.
Ing. Martin Klečka, CEO

OptiXs s.r.o.
Křivoklátská 37, 199 00 Praha 9
IČ: 02016770 DIČ: CZ02016770
www.optixs.cz

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SEZNAM SUBDODAVATELŮ

Zadavatel: Ústav fotoniky a elektroniky AV ČR, v.v.i.
Veřejná zakázka: DIRECT WRITE LASER LITHOGRAPHY SYSTEM
Uchazeč: OptiXs, s.r.o. se sídlem Křivoklátská 37, 199 00 Praha 9, IČ: 02016770

Subdodavatel: LOT-QuantumDesign GmbH

Im Tiefen See 58

64293 Darmstadt

Germany

ID: HRB 6538

Jako uchazeč o veřejnou zakázku „Direct write laser lithography system“ čestně prohlašujeme, že zamýšlíme plnit veřejnou zakázku prostřednictvím výše uvedeného subdodavatele. Subdodavatel je výrobcem nabízeného plnění. Prostřednictvím subdodavatele je prokazováno splnění technických kvalifikačních předpokladů.

V Praze dne 13.4.2016


Ing. Martin Klečka, jednatel
OptiXs, s.r.o.

OptiXs s.r.o.

Křivoklátská 37, 199 00 Praha 9
IČ: 02016770 DIČ: CZ02016770
www.optixs.cz

Nabídka vydaná

NAV0135/1617

Dodavatel:  OptiXs, s.r.o. Křivoklátská 37/9 19900 Praha Česká republika IČ: 02016770, DIČ: CZ02016770, Telefon: Fax: Mobil: +420 607 014 276 E-mail: info@optixs.cz WWW: www.optixs.cz		Odběratel - sídlo: Ústav fotoniky a elektroniky AV ČR, v. v. i. Chaberská 1014/57 18200 Praha Česká republika IČ: 67985882, DIČ: CZ67985882
Poštovní adresa: Ústav fotoniky a elektroniky AV ČR, v. v. i. Chaberská 1014/57 18200 Praha Česká republika		
Místo určení:		
Číslo poptávky:		
Forma úhrady: Způsob dopravy: Termín: Vystaveno: 13.04.2016		

Označení dodávky	Množství MJ	Sleva [%]	Cena za MJ	Sazba DPH	Základ [Kč]	Celkem [Kč]
MicroWriter lithography system MW2, complete system with 405 nm lasers	1,00 ks		3 962 850,00	21,00	3 962 850,00	4 795 048,50
Optional 375 nm laser writer for best performance with SU-8 resists	1,00 ks		273 300,00	21,00	273 300,00	330 693,00
Installation and training (3 days)	3,00 ks		40 995,00	21,00	122 985,00	148 811,85
Discount for configuration above	1,00 ks		-300 630,00	21,00	-300 630,00	-363 762,30
Shipment and insurance (from UK to UFE)	1,00 ks		40 995,00	21,00	40 995,00	49 603,95

Delivery time - 6 months.
 Validity of quotation - 90 days from the bid submission date.
 24 months warranty.

Payment terms:
 50% after the signature of the purchase contract
 50% after the delivery
 invoice due date 30 days.

Rekapitulace DPH v Kč

Základ 0%	0,00	DPH 0%	0,00
Základ 10%	0,00	DPH 10%	0,00
Základ 15%	0,00	DPH 15%	0,00
Základ 21%	4 099 500,00	DPH 21%	860 895,00
Celkem	4 099 500,00		860 895,00

Základ [Kč]	4 099 500,00
Celkem [Kč]	4 960 395,00


 Křivoklátská 37, 199 00 Praha 9
 IČ: 02016770 DIČ: CZ02016770
 www.optixs.cz

Registrace:

Registrováno u Městský soud v Praze pod číslem C 212818

Razítko a podpis

PURCHASE CONTRACT

(1) **Institute of Photonics and Electronic of the CAS, v. v. i.**

with its registered office at: Chaberská 1014/57, 182 51 Prague

registration no.: 67985882,

represented by: Prof. Ing. Jiří Homola, CSc., DSc., Director

("Buyer"); and

(2) **OptiXs, s.r.o.**

with its registered office at: Křivoklátská 37, 199 00 Prague 9

registration no.: 02016770

represented by: Ing. Martin Klečka, CEO

("Seller").

(The Buyer and the Seller are hereinafter jointly referred to as "**Parties**" and individually as "**Party**".)

IT WAS AGREED AS FOLLOWS:

1. INTRODUCTORY PROVISIONS

- 1.1 This Contract is closed based on the result of below-the-threshold public contract for supplies awarded in the form of simplified awarding procedure with the name "DIRECT WRITE LASER LITHOGRAPHY SYSTEM" realized by the Buyer as a public contracting authority (hereinafter "the public tender").

2. BASIC PROVISIONS

- 2.1 The Seller contracts to sell and the Buyer contracts to purchase Direct Write Laser Lithography System ("**Object of Purchase**") in the Bid from/..../2016 (*the Contracting Authority shall add the date of the bid*) (Annex 2) submitted in the above mentioned awarding procedure pursuant to the Tender Documentation attached as Annex 1 of this contract.
- 2.2 Detailed specification of Object of Purchase is stated in annexes of this Contract. Specification of Direct Write Laser Lithography System is in conformity with specification provided by winning bid, quoted by the seller in frame of the public tender and complies with all technical specifications required by the tender documents.
- 2.3 Under this Contract the Seller shall also carry out following activities (hereinafter "**Related Activities**"):
a) to transport the Object of Purchase to the place of delivery;

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- b) to verify that the Object of Purchase meets all requirements stipulated in this Contract and adjust the Object of Purchase in the place of delivery, if necessary;
- c) to elaborate and hand over to the Buyer operational, installation and maintenance manuals of the Object of Purchase and other documents that are necessary for use of the Object of Purchase in English or Czech language, printed together with electronic version;
- d) to provide training in a length of 3 days at the public contract implementation place;
- e) to hand over the declaration of conformity of the Object of Purchase with the approved standards, if there are any;

3. THE PLACE OF DELIVERY

- 3.1 The place of delivery is the following address: Chaberská 1014/57, 182 51 Prague, Czech Republic.

4. THE TIME OF DELIVERY

- 4.1 The Seller shall deliver the Object of Purchase and shall carry out Related Activities within six (6) months from the effectiveness of this Contract.
- 4.2 The Seller is entitled to handover the Object of Purchase and to carry out Related Activities during working days between 8:30 AM and 6:00 PM, unless otherwise agreed by the Parties. Exact working days shall be determined on the basis of mutual agreement. If the agreement is not reached, the Seller shall perform during the last day, on which it is possible to fulfill this Contract in time and the Buyer shall provide to the Seller for this purpose necessary cooperation.
- 4.3 Prior to the handover of the Object of Purchase and the execution of Related Activities the Seller may request the Buyer and the Buyer shall enable an inspection of premises to control the premises for installation of the Object of Purchase in such a way that their readiness for installation of the Object of Purchase is secured (e.g. a control of the location of electricity points, etc.) and possible deficiencies preventing timely and proper installation and demonstration of the operation of the Object of Purchase are eliminated.

5. PRICE AND PAYMENT TERMS

- 5.1 The purchase price for the Object of Purchase is 4 099 500,- CZK without value added tax ("VAT"), and with the VAT rate 21 % (if applicable in this case) is 4 960 395,- CZK (hereinafter "**Purchase Price**")
- 5.2 The Purchase Price cannot be exceeded and includes all costs and expenses of the Seller related to the performance of this Contract. The Purchase Price includes, among others, all expenses related to the handover of the Object of Purchase and execution of Related Activities, costs of copyright, insurance, warranty service and any other costs and expenses connected with the performance of this Contract.
- 5.3 The price may only be modified in connection with any changes to tax regulations regarding the VAT. The modification is done in accordance with the act no. 137/2006 Coll., on public procurement.

5.4 The Purchase Price for the Object of Purchase shall be paid in CZK on the basis of a tax documents – invoices, to the account of the Seller designated in the invoice. The Purchase Price shall be paid in the following manner:

- a) 50 % of the Purchase Price shall be paid after the signature of this Contract; and
50 % of the Purchase Price shall be paid after the delivery of the final invoice to which the signed Handover Protocol shall be attached.
- b) The Buyer shall realize for each payment as itemized in previous section on the basis of duly issued invoices within 30 days from their receipt of the invoice via bank transfers. The invoice shall be considered to be paid for on the day when the invoiced amount is deducted from the Buyer's account on behalf of the Seller's account.

5.5 The invoice issued by the Seller as a tax document must contain all information required by the applicable laws of the Czech Republic. Invoices issued by the Seller in accordance with this Contract shall contain in particular following information:

- a) business name of the Seller, address of his settlement, registered place of business, eventually his premise, and his VAT number
- b) Seller's bank connection (title and address of seller's bank, SWIFT code),
- c) Seller's number of bank account (also in IBAN version),
- d) business name of the Buyer, address of his settlement, registered place of business, eventually his premise and his VAT number
- e) sequence number of invoice,
- f) date of subject of contract delivery, if this date can be determined and if it is different from date of invoice issue,
- g) date of invoice issue
- h) quantity and kind of delivered goods,
- i) total price required to pay in currency CZK rounded to two decimal places
- j) number and title of Contract

and must comply with the double tax avoidance agreements, if applicable.

5.6 In case that the invoice shall not contain the above mentioned information, the Buyer is entitled to return it to the Seller during its maturity period and this shall not be considered as a default. The new maturity period shall begin from the receipt of the supplemented or corrected invoice to the Buyer.

5.7 Final invoice must be delivered to the Buyer on December 16, 2016, at the latest.

6. THE OWNERSHIP RIGHT

The ownership right to the Object of Purchase shall be transferred to the Buyer upon the signature of the Handover Protocol (as defined below) by both Parties and after the payment of the total net Purchase Price specified under the conditions specified in Clause 5.

7. SELLER'S DUTIES

- 7.1 The Seller shall ensure that the Object of Purchase and Related Activities are in compliance with this Contract including all its annexes and applicable legal (e.g. safety), technical and quality norms.
- 7.2 The Seller shall be responsible for all expenses related to the performance of this Contract, unless this Contract stipulates otherwise.
- 7.3 The Seller is aware that the Buyer does not have at its disposal premises for the storage of packaging and, therefore, shall not store packaging of the Object of Purchase after the installation. The absence of original packaging cannot be an excuse for refusal of elimination of defects of the Object of Purchase.

8. HANDOVER OF THE OBJECT OF PURCHASE

- 8.1 Related Activities must be performed in the presence of representative of both Parties prior to the handover and takeover of the Object of Purchase.
- 8.2 Handover and takeover of the Object of Purchase shall be realized on the basis of a handover protocol, which shall contain following information ("**Handover Protocol**"):
 - a) identification of the Seller, Buyer and subcontractors, if there are any,
 - b) declaration of the Seller and Buyer that all Related Activities were carried out,
 - c) description of the Object of Purchase, and
 - d) date of the signature.
- 8.3 If the Seller does not hand over to the Buyer all above mentioned documents or if the Seller fails to duly carry out all Related Activities or if the Object of Purchase does not meet requirements of this Contract, the Buyer is entitled to refuse the takeover of the Object of Purchase. In such a case the Seller shall remedy the deficiencies within ten (10) working days, unless Parties agree otherwise. The Buyer is entitled (but not obliged) to take over the Object of Purchase despite the above mentioned deficiencies, in particular if such deficiencies do not prevent the Buyer in the proper operation of the Object of Purchase. In such a case the Seller and the Buyer shall list the deficiencies in the Handover Protocol, including the manner and the date of their removal (remedy). If the Parties do not reach agreement in the Handover Protocol regarding the date of the removal or remedy, the Seller shall remove the deficiencies within ten (10) working days.
- 8.4 In case that the Seller notifies the Buyer that the Object of Purchase is eligible for handover and takeover and during the course of the handover procedure it will be ascertained that the conditions under this Contract for the signature of the Handover Protocol are not fulfilled and based on this reason the Buyer will refuse to sign the Handover Protocol, then the Seller shall reimburse the Buyer for all costs that were incurred by the Buyer due to unsuccessful handover.

9. WARRANTY

- 9.1 The Seller shall provide a warranty of quality of the Object of Purchase for the period of 24 months. If on the warranty list or other document is the warranty period of longer duration, then this longer warranty period shall have priority over the period stated in this Contract.

- 9.2 The warranty period shall begin on the day of the signature of the Handover Protocol by both Parties. If the Handover Protocol lists any deficiencies, the warranty period shall begin on the day, which follows the day, in which the last deficiency was removed.
- 9.3 The Seller shall remove defects that occur during the warranty period free of charge and in the terms stipulated in this Contract.
- 9.4 If the Buyer ascertains a defect of the Object of Purchase during the warranty period, the Buyer shall notify such defect without undue delay to the Seller. Defects may be notified on the last day of warranty period, at the latest.
- 9.5 The Buyer notifies defects in writing via e-mail. The Seller shall accept notifications of defects on the following e-mail address: servis@optixs.cz. The Seller shall confirm in writing the receipt of the notification within 72 hours from the receipt of the notification.
- 9.6 In the notification the Buyer shall describe the defect and the manner of removal of the defect. The Buyer has the right to:
- a) ask for the removal of the defect by the delivery of new Object of Purchase or its individual parts, or
 - b) ask for the removal of the defect by repair, or
 - c) ask for the reasonable reduction of the Purchase Price.
- The choice among the above mentioned rights belongs to the Buyer. The Buyer is also entitled to withdraw from this Contract, if by delivering the Object of Purchase with defects this Contract is substantially breached.
- 9.7 The Seller shall remove the defect within 14 days from the receipt of notification of the Buyer, unless Parties agree otherwise.
- 9.8 The Seller shall remove the defect within terms stipulated in this Contract even if the notification of the defect is in his opinion unjustified. In such a case the Seller is entitled to ask for reimbursement of the costs of removal of the defect. If Parties disagree on whether the notification of the defect is justified or not, the Buyer shall ask an expert for the expert's opinion, which shall determine whether the notification of the defect was justified or not. In the case that the expert shall consider the notification as justified, then the Seller shall bear costs of the expert's opinion. If the expert considers the notification to be unjustified, then the Buyer shall reimburse the Seller for verifiably and effectively incurred costs of removal of the defect.
- 9.9 Parties shall execute a protocol on the removal of the defect, which shall contain the description of the defect and the confirmation that the defect was removed. The warranty period shall be extended by a period of time that elapses between the notification of the defect until its removal.
- 9.10 In case that the Seller does not remove the defect within stipulated time or if the Seller refuses to remove the defect, then the Buyer is entitled to remove the defect at his own costs and the Seller shall reimburse these costs within 10 days after the Buyer's request to do so.
- 9.11 The warranty does not cover defects caused by unprofessional manipulation or by the failure to follow Seller's instructions for the operation and maintenance of the Object of Purchase.

10. REPRESENTATIONS AND WARRANTIES OF THE SELLER

10.1 The Seller represents and warrants to the Buyer that

- a) has all the professional prerequisites necessary for the proper fulfilment of this Contract,
- b) is fully authorized to perform this Contract, and
- c) there are no obstacles on the Seller's side that would preclude him from the due performance of this Contract.

11. PENALTIES

- 11.1 If the Seller is in default regarding the delivery of the Object of Purchase, i.e. the Seller breaches its duty to perform this Contract in time and due manner, the Seller shall pay to the Buyer a contractual penalty in the amount of 0,1% of the Purchase Price for every (even commenced) day of default.
- 11.2 If the Seller is in default with the removal of the defect, the Seller shall pay to the Buyer a contractual penalty in the amount of 0,05% of the Purchase Price for every (even commenced) day of default.
- 11.3 The Seller shall pay contractual penalties within fifteen (15) days from the day, on which the Buyer enumerated its claims. The payment of contractual penalties shall not affect the right of the Buyer to damages even to the extent to which such damages exceeds the contractual penalty.
- 11.4 Total amount of contractual penalties that the Buyer is entitled to claim shall not exceed 30 % of the Purchase Price.
- 11.5 The Buyer is entitled to unilaterally set off claims arising from the contractual penalties against the claim of the Seller for the payment of the Purchase Price.

12. RIGHT OF WITHDRAWAL

- 12.1 The Buyer is entitled to withdraw from this Contract without any penalties, if any of the following circumstances occur:
 - a) the Seller shall be in delay with the fulfilment of this Contract and such delay lasts more than two (2) months;
 - b) the Object of Purchase shall not fulfil the requirements stipulated in this Contract
 - c) the insolvency proceeding is initiated against the Seller; or
 - d) the Buyer ascertains that the Seller provided in its bid for the Public Tender information or documents that do not correspond to the reality and that had or could have had impact on the result of the tendering procedure, which preceded the conclusion of this Contract.

13. REPRESENTATIVES OF THE PARTIES

13.1 The Seller appoints following representatives for the communication with the Buyer:

In technical matters:

Name: Nicholas Scott Lynn

E-mail: lynn@ufe.cz

Tel.: +420 266 773 453

In contractual matters:

Name: Karel Chadt

E-mail: chadt@ufe.cz

Tel.: +420 266 773 545

13.2 The Buyer appoints following representatives for the communication with the Seller:

Name: Ing. Martin Klečka

E-mail: klecka@optixs.cz

Tel.: +420 607 014 278

Name: Ing. Aleš Jandík

E-mail: jandik@optixs.cz

Tel.: +420 607 014 292

14. **FINAL PROVISIONS**

- 14.1 This Contract is governed by the laws of the Czech Republic, especially by the Civil Code (Act. No 89/2012 Coll., Civil Code).
- 14.2 All disputes arising out of this Contract or out of legal relations connected with this Contract shall be preferable settled by a mutual negotiation. In case that the dispute is not settled within sixty (60) days, such dispute shall be decided by courts of the Czech Republic in the procedure initiated by one of the Parties.
- 14.3 The Seller bears the risk of changed circumstances within the meaning of Section 1765 of the Civil Code.
- 14.4 The Seller takes into account that the Buyer is not in relation to this Contract an entrepreneur, nor the subject matter of this Contract is connected with the business activities of the Buyer.
- 14.5 The Seller is not entitled to set off any of its claims or his debtor's claims against the Buyer's claims. The Seller is not entitled to transfer its claims against Buyer that arose on the basis or in connection with this Contract on third parties. The Seller is not entitled to transfer rights and duties from this Contract or its part on third parties.
- 14.6 All modifications and supplements of this Contract must be in writing.
- 14.7 If any of provisions of this Contract are invalid or ineffective, the Parties are bound to change this Contract in such a way that the invalid or ineffective provision is replaced by a new provision that is valid and effective and to the maximum possible extent correspond to the original invalid or ineffective provision.

- 14.8 If any Party breaches any duty under this Contract and knows or should have known about such breach, it shall notify it to the other Party and shall warn such Party of possible consequences of the breach.
- 14.9 This Contract is executed in two (2) copies and every Party shall receive one (1) copy.
- 14.10 This Contract shall be valid and effective on the date of the signature of both Parties.

Enclosures:

1. Tender documentation
2. Bid Submitted by the Seller/Bidder

IN WITNESS WHEREOF attach Parties their handwritten signatures:

Buyer

Signature: _____
Name: Prof. Ing. Jiří Homola, CSc., DSc.
Position: director
Date:

Seller

Signature: _____
Name: Ing. Martin Klečka
Position: CEO
Date: 13.4.2016

OptiXs s.r.o.

Křivoklátská 37, 199 00 Praha 9
IČ: 02016770 DIČ: CZ02016770
www.optixs.cz

Annex No. 4 Technical Specification

The Contracting Authority hereby states the minimal or maximal values for technical parameters of the required subject matter in the column B.

The Bidder shall state either the concrete values describing the offered performance for the requirements REQ_03 - REQ_12 or whether the offered solution disposes of the required functionality for requirements REQ_01, REQ_02, REQ_13- REQ_17 in the column C. The Bidder shall be obliged to state for requirements REQ_01, REQ_02, REQ_13- REQ_17 a reference to the technical documentation.

Should the offered value for the requirements REQ_03 - REQ_12 be stated by the Bidder outside from the value stated in the column B, the bid shall be excluded for the reason of failing to meet the tender conditions.

Should the Bidder state for the requirements REQ_01, REQ_02, REQ_13- REQ_17 that the offered solution does not provide this functionality, the bid shall be excluded for the reason of failing to meet the tender conditions.

	A	B	C
No.	Description of Parameter	Required	
REQ_01	Light source on 375 nm	yes	yes
REQ_02	Light source on 405 nm	yes	yes
REQ_03	Working surface	$\geq 100 \text{ mm} \times 100 \text{ mm}$	195 x 195 mm
REQ_04	Minimum substrate size	$\leq 10 \text{ mm} \times 10 \text{ mm}$	$< 1 \text{ mm} \times 1 \text{ mm}$
REQ_05	Maximum substrate size	$\geq 4" \times 4$	230 x 230 mm
REQ_06	Minimum substrate thickness	$\leq 0,15 \text{ mm}$	$< 0,15 \text{ mm}$
REQ_07	Maximum substrate thickness	$\geq 2 \text{ mm}$	15 mm
REQ_08	Minimum feature size	$\leq 0,6 \mu\text{m}$	$< 0,6 \mu\text{m}$
REQ_09	Minimum feature aspect ratio*	> 10	> 10
REQ_10	Writing speed **	$\geq 1 \text{ mm}^2/\text{min}$	2 mm ² /min (full-area exposure across 150mm x 150mm in standard quality raster mode on laser

			resolution 0,6 μm)
REQ_11	X-Y stage resolution	$\leq 1 \mu\text{m}$	$< 1 \mu\text{m}$
REQ_12	Temperature stabilization of the substrate	$\leq \pm 1^\circ\text{C}$	$< \pm 1^\circ\text{C}$
REQ_13	Optical autofocus	yes	yes
REQ_14	Surface profilometer tool ***	yes	yes
REQ_15	Passive vibration isolation table	yes	yes
REQ_16	PC for system control (MS windows)	yes	yes
REQ_17	Software supported DXF format	yes	yes

* Feature aspect ratio: feature height / feature width

** Writing speeds: full-area exposure across 100 mm $\times$ 100mm in standard quality raster mode on laser resolution 0,6 μm

*** Surface profilometer tool: system for characterization of the surface height (Z coordinate) along X or Y axis (line scan)

Direct Write Laser Lithography System

Technical description:

The subject of delivery would be the Direct Write Laser Lithography System (DWLLS) MicroWriter MW2, which provides the precise fabrication of microstructures for a variety of applications. The DWLLS will meet all technical parameters required in Annex No. 4. of the tender documentation.

The list of delivered parts would be :

- MicroWriter lithography system MW2, complete system includes :
 - 1x 1um resolution 405nm laser writer with 690nm imaging laser and through the lens reflection detector for scanning laser microscopy and system calibration.
 - 1x 0.6um resolution 405nm laser writer with through the lens reflection detector for system calibration.
 - 8 x 5um resolution 405nm lasers focused through a single lens with through the lens reflection detector for system calibration.
 - 1 x1µm resolution 375 nm laser writer for best performance with SU-8 resists
 - Real time CCD video camera with red LED illumination and x5 microscope objective for wide field viewing of sample surface.
 - Real time CCD video camera with red LED illumination and high resolution microscope objective (x40 effective magnification) for high accuracy alignment to existing features on sample surface.
 - Temperature stabilized enclosure (+/- 1°C)
 - Passive vibration isolation table
 - Electrical 19" control rack with motion controller and PC
 - Alignment target for calibration
 - Control software
 - Vacuum pump including extension pipework
 - All necessary hardware like as cables, power supplies
 - Operation manual in English
- Installation and training
- Shipment and insurance
- 2 years of fully comprehensive warranty (all parts, labour, travel and subsistence) for complete system, including any options.
- 5 years of fully comprehensive warranty (all parts, labour, travel and subsistence) for 405 nm laser diodes
- Lifetime free software upgrades (providing the hardware supports new software features)

We will provide the complete system including all the components required for the system to operate it independently.

Technical parameters:

No.	Description of Parameter	Required	Offered performance
REQ_01	Light source on 375 nm	yes	YES
REQ_02	Light source on 405 nm	yes	YES
REQ_03	Working surface	$\geq 100 \text{ mm} \times 100 \text{ mm}$	195 x 195 mm
REQ_04	Minimum substrate size	$\leq 10 \text{ mm} \times 10 \text{ mm}$	$< 1 \text{ mm} \times 1 \text{ mm}$
REQ_05	Maximum substrate size	$\geq 4" \times 4$	230 x 230 mm
REQ_06	Minimum substrate thickness	$\leq 0,15 \text{ mm}$	$< 0,15 \text{ mm}$
REQ_07	Maximum substrate thickness	$\geq 2 \text{ mm}$	15 mm
REQ_08	Minimum feature size	$\leq 0,6 \mu\text{m}$	$< 0,6 \mu\text{m}$
REQ_09	Minimum feature aspect ratio (feature height / feature width)	> 10	> 10
REQ_10	Writing speed (full-area exposure across 100 mm x 100mm in standard quality raster mode on laser resolution 0,6 μm)	$\geq 1 \text{ mm}^2/\text{min}$	2 mm ² /min (full-area exposure across 150mm x 150mm in standard quality raster mode on laser resolution 0,6 μm)
REQ_11	X-Y stage resolution	$\leq 1 \mu\text{m}$	$< 1 \mu\text{m}$
REQ_12	Temperature stabilization of the substrate	$\leq \pm 1^\circ\text{C}$	$< \pm 1^\circ\text{C}$
REQ_13	Optical autofocus	yes	YES
REQ_14	Surface profilometer tool (system for characterization of the surface height (Z coordinate) along X or Y axis (line scan))	yes	YES

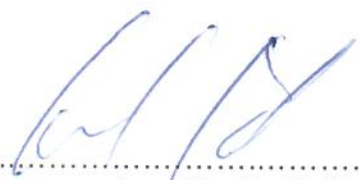
REQ_15	Passive vibration isolation table	yes	YES
REQ_16	PC for system control (MS windows)	yes	YES
REQ_17	Software supported DXF format	yes	YES

Software and system features :

- There is no minimum size or shape – even sub-millimeter fragments can be accommodated.
- System can cope with bowed, wedged or structured wafers and fragments.
- Multi-wafer software tool allows multiple chips or wafers
- No edge exclusion region.
- Samples are held in place using a vacuum chuck
- Autofocusing and wedge / bow correction are performed before exposure.
- An automatic flattening system allows thickness measurements to be made at regular intervals along the x- and y-axes of the sample and any bow (quadratic fitting function) or wedge (linear fitting function) to be identified.
- System contains full single-pass greyscale electronics with 256 physical grey
- Surface profiling
- Automatic device inspection
- System supports x-raster, y-raster and vector mode exposures.
- Different jobs in the exposure job list can be assigned different exposure modes.
- 'wide field viewer' function which allows a large number of microscope images to be automatically recorded at different locations and then stitched together to form a very wide field of view.
- A 'job list builder' tool allows arrays of exposures to be automatically generated.
- Dose-gradients and focus gradients can be applied along the x- and y-axes of the array.

Details and parameters are mentioned in attached specs sheet also. These are indicative, guaranteed parameters are in table above.

Prague, 15.4..2015



 Ing. Martin Klečka, CEO
 OptiXs, s.r.o.

List of attachement :

Price quote
 MicroWriter datasheet and description

OptiXs s.r.o.
 Křivoklátská 37, 199 00 Praha 9
 IČ: 02016770 DIČ: CZ02016770
www.optixs.cz

Dodavatel:  OptiXs, s.r.o. Křivoklátská 37/9 19900 Praha Česká republika IČ: 02016770, DIČ: CZ02016770, Telefon: Fax: Mobil: +420 607 014 276 E-mail: info@optixs.cz WWW: www.optixs.cz	Odběratel - sídlo: Ústav fotoniky a elektroniky AV ČR, v. v. i. Chaberská 1014/57 18200 Praha Česká republika IČ: 67985882, DIČ: CZ67985882
Forma úhrady: Způsob dopravy: Termín: Vystaveno: 13.04.2016	Poštovní adresa: Ústav fotoniky a elektroniky AV ČR, v. v. i. Chaberská 1014/57 18200 Praha Česká republika Místo určení: Číslo poptávky:

Označení dodávky	Množství MJ	Sleva [%]	Cena za MJ	Sazba DPH	Základ [Kč]	Celkem [Kč]
MicroWriter lithography system MW2, complete system with 405 nm lasers	1,00 ks		3 962 850,00	21,00	3 962 850,00	4 795 048,50
Optional 375 nm laser writer for best performance with SU-8 resists	1,00 ks		273 300,00	21,00	273 300,00	330 693,00
Installation and training (3 days)	3,00 ks		40 995,00	21,00	122 985,00	148 811,85
Discount for configuration above	1,00 ks		-300 630,00	21,00	-300 630,00	-363 762,30
Shipment and insurance (from UK to UFE)	1,00 ks		40 995,00	21,00	40 995,00	49 603,95

Delivery time - 6 months.
 Validity of quotation - 90 days from the bid submission date.
 24 months warranty.

Payment terms:
 50% after the signature of the purchase contract
 50% after the delivery
 invoice due date 30 days.

Rekapitulace DPH v Kč

Základ 0%	0,00	DPH 0%	0,00
Základ 10%	0,00	DPH 10%	0,00
Základ 15%	0,00	DPH 15%	0,00
Základ 21%	4 099 500,00	DPH 21%	860 895,00
Celkem	4 099 500,00		860 895,00

Základ [Kč]	4 099 500,00
Celkem [Kč]	4 960 395,00

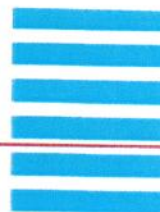
OptiXs s.r.o.

Křivoklátská 37/199 00 Praha 9
 IČ: 02016770 DIČ: CZ02016770
 www.optixs.cz

Registrace:

Registrováno u Městský soud v Praze pod číslem C 212818

Razítko a podpis



MicroWriter ML[®]2

Laser lithography system specifications



Fig. 1 MicroWriter ML[®]2

Introduction

MicroWriter ML[®]2 is a flexible photolithography machine designed for rapid prototyping and small volume manufacture in R&D laboratories and small clean rooms.

Conventional approaches to photolithography are usually based on exposing through a chromium-glass mask manufactured by specialist vendors. In R&D environments it is often necessary to change the mask design frequently. Direct-write laser lithography overcomes this problem by holding the mask in software. Rather than projecting light through a physical mask, direct-write laser lithography rasters the sample beneath a number of computer-controlled lasers, each pulsing on and off in order draw the pattern to be exposed directly onto the photoresist.

MicroWriter ML[®]2 is a new design of direct-write laser lithography machine which combines the flexibility of maskless direct writing with high speed and low cost. A unique feature of the MicroWriter ML[®]2 is that the system contains multiple lasers, each with its own focused spot size or wavelength. Advanced software moves the wafer such that the selected laser is in the correct position for writing. This means that the user can change selected lasers entirely through software; all other systems on the market require the user to physically change a lens, usually using mechanical tools. Since in MicroWriter ML[®]2 all lasers are simultaneously available, the user can assign different lasers to different parts of an exposure. For example, a large spot size might be used for writing contact pads quickly which then connect to a much finer microwire which is written using a tightly focused beam. The other special feature

of the MicroWriter ML[®]2 is that it is designed with the R&D community in mind. Software, while being feature-rich, is intuitive, beautifully layed out and easy to learn. Unlike some other machines which have designs rooted in manufacturing, the MicroWriter ML[®]2 offers maximum flexibility to research-based users who want to experiment and try out new things.

Laboratory space requirement

MicroWriter ML[®]2 is a fully self-contained unit with its own anti-vibration support. Keyboard and monitor are integrated into the unit and a control rack containing the system electronics and PC sits underneath the instrument. The MicroWriter ML[®]2 occupies a total footprint of 1.5 m x 2 m and is powered from a single standard mains outlet. The outer case, which is designed to minimise dust accumulation and can be wiped down using alcohol for use in cleanrooms, protects the sample from room lighting during exposure, allowing the machine to be used outside of yellow-light areas and clean rooms. With the exception of loading wafers and setting the stabilisation temperature, the entire instrument can be controlled remotely using a remote desktop client.

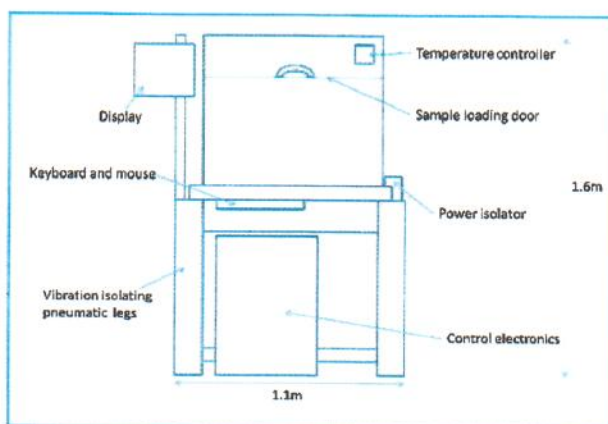


Fig. 2 Machine dimensions

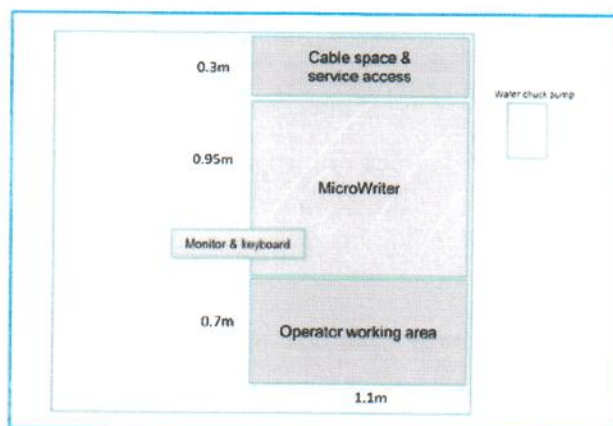


Fig. 3 Typical room layout



MicroWriter ML®2

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Internal temperature stabilisation

In order to maximise stability and repeatability, the MicroWriter ML®2 contains an active temperature stabilisation system that keeps the internal temperature of the equipment and the exposed wafer constant to within 1 °C.

Resolution

The base-system comes with a 0.6 µm resolution laser writer, a 1 µm resolution laser writer and eight 5 µm resolution lasers arranged as a cluster in the turbo writer for parallel writing.

Wavelengths

The standard exposure wavelength is 405 nm which will expose G-line, H-line and broadband resists. A 375 nm laser writer can also be added as an option for shorter wavelength resists such as SU-8 (OPT-UV). All lasers are long-life semiconductor lasers with advanced electrostatic discharge protection and current stabilisation electronics and have high speed pulsing drivers.

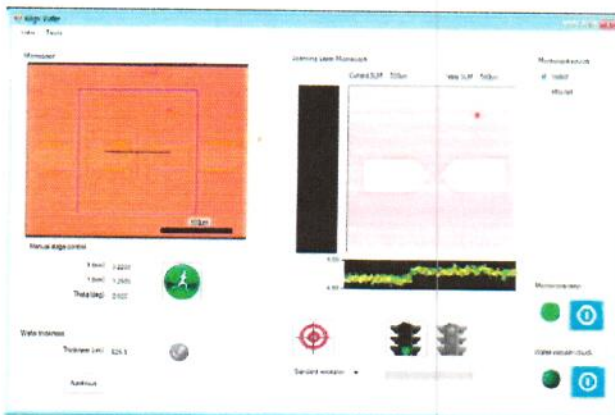


Figure 4: A software screen shot showing (left) the x5 real time video microscope and (right) a close-up SLM image of existing structures on the wafer.

Alignment

Two alignment systems are provided (Figure 4). The first is a pair of real time video microscopes with two different magnification settings (x5 and x40) that allows the wafer surface to be seen on the computer monitor. The second is a high accuracy scanning laser microscope (SLM) which rasters the wafer underneath one of the exposing objective lens but with red laser light focused through it. A through-the-lens optical detector captures the reflected laser light allowing an image of a small part of the surface to be built up. The SLM is particularly sensitive to edges and so can detect resist patterns which have little intensity contrast (and so are invisible to conventional microscopy) but which present sharp walls.

It also offers a very high dynamic range, allowing low-contrast items such as single flakes of graphene to be picked out from the background. Software allows multiple markers on the wafer surface to be identified either by the user or by an automatic pattern recognition algorithm, and corrections made for offset, rotation, stretch and shear in the positioning of the wafer (Figure 5).

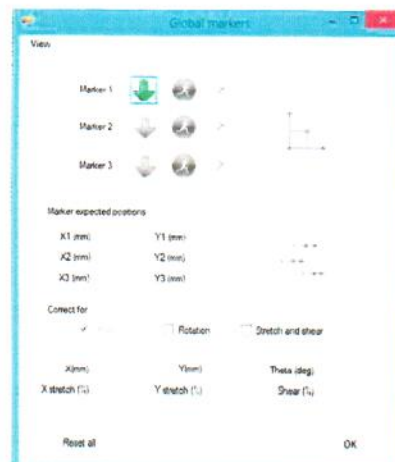


Figure 5: Using markers to align an exposure to existing structures.

The two systems allow alignment of the exposed pattern to existing features on the wafer within $\pm 1 \mu\text{m}$ (3σ) accuracy.

The fields of view of the different microscopes are as follows:

- x5 real time video microscope (no digital zoom): 1.1 mm x 0.9 mm
- x40 real time video microscope (no digital zoom): 130 µm x 80 µm
- SLM: 50 µm – 2000 µm (user selectable by rotating the mouse wheel)

Both real time video microscopes have in addition a x4 digital zoom.

Focusing

A built-in automatic focus system images a red laser through one of the writing objectives and adjusts the Z motor stage until the red laser spot is in focus. To bring a new wafer into focus the user clicks a single software button. Unlike some autofocus systems which require a minimum area of wafer to work, the MicroWriter ML®2 autofocus can work with arbitrarily small samples, making the machine ideal for patterning individual dies as well as larger wafers.

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The autofocus has an operating mode called Focus Lock in which the wafer surface is progressively profiled in Z during the exposure using the autofocus system and the results fed forward to the motion controller such that the sample is automatically moved up and down during exposure to keep the surface precisely in focus. This means the system can follow all local variations in thickness of the wafer and not just simple linear slopes. The user is given full control – intentional shifts from the measured focal plane can easily be included in the exposure for quasi 3-dimensional exposures.

Both the static autofocus system and the dynamic Focus Lock system can find focus across a $\pm 200\text{ }\mu\text{m}$ Z-range with a repeatability of $\pm 0.2\text{ }\mu\text{m}$. Transparent substrates such as glass work well with the autofocus system.

Writing speed

The exact writing speed depends upon the pattern being exposed. Most R&D patterns contain a combination of large areas (e.g. wire bond pads) and a small number of minimum feature size structures. The MicroWriter ML[®]2 is optimised for such scenarios, allowing lasers of different spot size and accuracy to be combined within one exposure.

Table 1 shows the average areal writing speeds for different lasers assuming a typical pattern being exposed across a 150 mm diameter wafer using 'standard' quality setting ('draft' quality for turbo mode). In this context mm^2/min refers to the area of the wafer exposed and not the area of illuminated pixels. Small wafers or higher quality settings will show a lower average writing speed.

Writing speeds	
Laser	Areal writing speed
1 μm	4 $\text{mm}^2/\text{minute}$
0.6 μm	2 $\text{mm}^2/\text{minute}$
5 μm (operating as a single laser)	16 $\text{mm}^2/\text{minute}$
5 μm (8 lasers in parallel – 'turbo' mode)	180 $\text{mm}^2/\text{minute}$

During exposure the control software shows progress by displaying on the computer screen the pattern exposed so far (Figure 6) and an estimate of exposure time remaining.

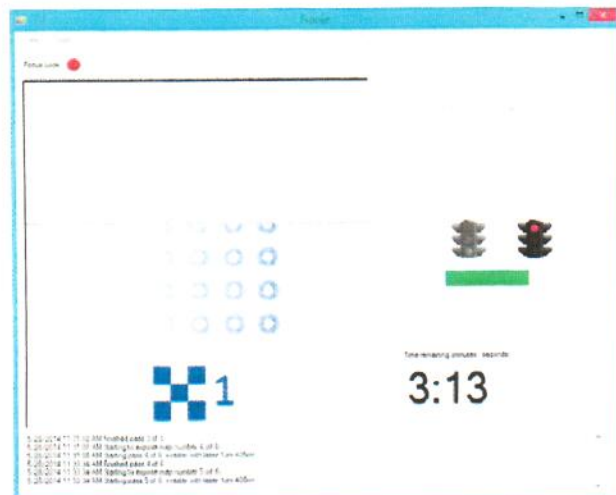


Figure 6: A software screen shot during exposure

Wafer size

Wafers up to 230 mm in diameter can be used. Up to 195 mm square can be exposed with full accuracy maintained across the wafer. Single wafer pieces as small as 1 mm^2 or smaller can also be accommodated. A vacuum chuck holds the wafer tightly from behind during exposure. A plastic mask is provided to accompany the vacuum chuck, covering up unused vacuum holes when using small samples. Wafers up to 15 mm thick can be accommodated.

The multi-wafer software feature allows multiple chips or wafers to be placed on the vacuum chuck and each one given its own coordinate system (including its own rotation, offset, stretch, shear and local precision corrections) and set of jobs to expose. This allows multiple users to share overnight runs of the machine.

Edge roughness and addressable grid size

On launching an exposure the system must render the supplied exposure files into a grid of pixels to expose. The user can set the size of those rendered pixels. The ratio between the size of the focused laser spot and the rendered pixel size is known as the 'quality' setting, since it determines how smooth angled or curved edges will appear. There are four quality settings: draft (pixel size is larger than the laser size); normal (pixel size equals the laser size); high and super (pixel size is smaller than the laser size). Smaller pixels give smoother angled or curved edges but take longer to expose because more raster lines are needed.

In addition to pixilation roughness on angled or curved edges, there will be a small amount of random noise in exposed edges even if they fall exactly along the pixel grid (e.g. vertical or horizontal edges). For the



MicroWriter ML[®]2

Laser lithography system specifications

MicroWriter ML[®]2, this random noise is unmeasurably small for edges which are parallel to the raster direction and is approximately 150 nm (3σ) for edges which are perpendicular to the raster direction. In order to maximise the smoothness of edges, the user can select either x- or y-rastering for a given job and can combine different raster directions in one exposure.

Turbo writer exposures can have small (up to $\sim 10\ \mu\text{m}$) stitching steps between the different lasers and so are only recommended for non-critical large area jobs such as electrical contact pads.

Combining exposure jobs

Multiple exposure jobs can be combined, each with different exposure properties. See Figure 7 & 8. For example, one job might use the 1 μm -resolution laser at high quality to expose a fine microwire and another job might use the 5 μm -resolution laser at draft quality to connect large contact pads to the microwire. The system will automatically collect all of these different exposure conditions together and expose them as requested in the most time efficient way possible.

In addition to assigning laser and pixel size to each job, job-specific corrections to dose and focus may also be applied. This can be used as a manual way to compensate for proximity effect and to experiment with 3-dimensional structuring by intentionally shifting the focal plane.

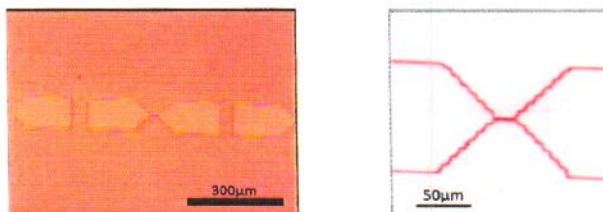


Figure 7: Optical micrograph (left) and Scanning Laser Micrograph (right) of a microwire connected to two large contact pads fabricated using the two exposure jobs of Figure 8.

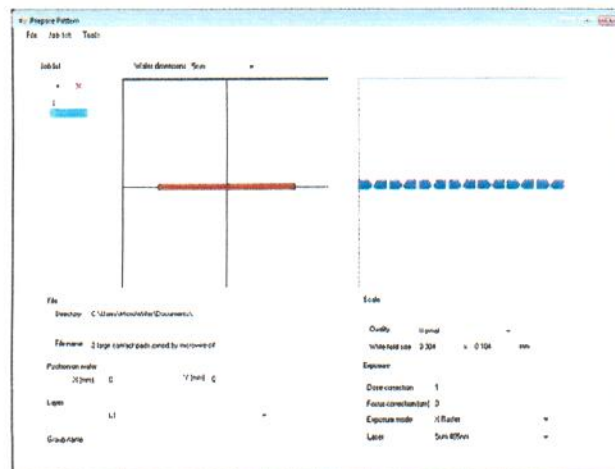


Figure 8: Two exposure jobs using different lasers.

File format

Exposure patterns can be supplied either as vector files (CIF format) or as bitmap files (BMP or TIFF format). Vector files retain their correct exposure size regardless of the selected laser or quality setting and so are very convenient when combining different exposure conditions. Both vector files and bitmap files are exposed by the system using stage rastering.

Wafer layout design

The MicroWriter ML[®]2 is supplied with licenced Clewin 5 mask design software (see Figure 9). This can be used to design multilayer mask files and also to read in existing mask designs in a range of standard vector formats (DXF, GDSII, Gerber) and to convert them to the native vector format of the MicroWriter ML[®]2, which is CIF. Wafer designs can be set up to mimic a stepper, i.e. a single die design is supplied which is then to be repeated at various places across the wafer, or the entire wafer can be described as a single layout, thus removing stitching errors. Unlike electron beam lithography systems, there is no limit on the write field size (up to the wafer size limit). Clewin 5 also allows different layers to be defined in an exposure. These layers can then be assigned to different lasers or exposure conditions in the job list.

MicroWriter ML®2

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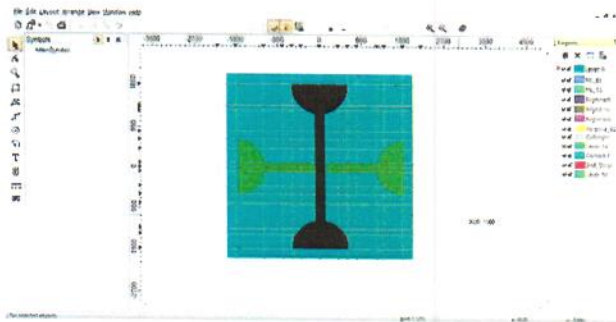


Figure 9: A multilayer mask design using Clewin 5 software

Grey scale exposure

The 0.6 μm and 1 μm laser writers have grey-scale enabled driver electronics with 255 levels. To access grey scale exposure, a colour bitmap file is supplied – the intensity level of each pixel is then converted into laser dose. In addition, if different jobs are provided with different dose corrections the system will use the grey scale electronics to expose both jobs at the same time, dynamically adjusting the laser power depending on which job a given exposed pixel belongs to. This function speeds up the time taken to perform dose tests by allowing all of the different doses to be exposed at once.

No grey scale function is provided with the 5 μm laser writer or the turbo writer.

Calibration and maintenance

The MicroWriter ML®2 contains software for automatic recalibration whenever necessary. Simply press the Autocalibrate Lasers software button and the system will automatically recalibrate all of the lasers using a precision glass alignment disk supplied with the system. Similar functions exist for recalibrating the real time video microscopes.

All lasers are solid state and are maintenance-free with long lifetimes. Lasers and motors can be replaced and recalibrated on-site by service engineers without equipment being returned to the manufacturer.

Remote access client software is included to allow service engineers to gain remote access to the machine to diagnose faults without the need for a site visit.

Control software

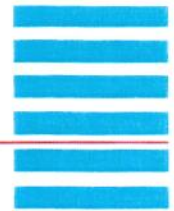
The MicroWriter ML®2 is controlled by a simple and intuitive Windows interface. A simple toolbar guides the user through the basic steps of layout design, wafer alignment and then exposure. The MicroWriter ML®2 control PC (supplied with system) runs a Windows 7 or Windows 8 operating system. Software updates are automatically announced and delivered to the user by cloud service.

User management

The MicroWriter ML®2 software runs in any of three operator modes: User, Supervisor and Service. In User mode no calibration changes can be made so an inexperienced user cannot adversely affect the system for other users. In Supervisor mode, the ability to run an automatic calibration procedure is added, but no other 9 lasting changes can be made (bad recalibrations can be undone through a calibration 'roll-back' feature which allows any previous calibration state throughout the entire lifetime of the machine to be recalled). In Service mode, full access is given to all functions.

External interfacing

The MicroWriter ML®2 system exposes a TCP/IP interface which, when enabled by the user, allows other networked computers to send low level control commands to the system. These commands give direct control of the lasers, the motors and the microscopes and provide a means of developing new experiments and functions using the MicroWriter ML®2 as a platform.



MicroWriter ML[®]2

Laser lithography system specifications

Special features

- **Wafer inspection tool:** the user can provide a list of coordinates which the MicroWriter ML[®]2 will then automatically visit, perform an autofocus and capture a microscope image (real time video microscope or SLM) at each location. This allows finished wafers with multiple dies to be automatically inspected for quality.
- **Surface profilometer tool:** the Focus Lock autofocus system can be used outside of exposing mode as a surface profilometer. The user selects the location on the wafer and the length of the profile scan and the system will measure the Z-variation along the x- or y-axis.
- **Automatic marker detection and correction:** in addition to the three markers used to align the wafer, the user can supply a list of secondary markers distributed across the wafer. The system will automatically visit each, autofocus on it, capture a microscope image and identify the difference in its position compared to the expected position. This allows a map of small (x,y) distortions to be build up across the wafer. The system will then distort the exposure field to compensate for these errors. This allows precision alignment between existing structures and overlaid exposures across large wafers, even in the presence of distortions on the wafer from other lithography tools.
- **Wide field viewer:** the two real time video microscopes have a feature called Wide field viewer which allows multiple images to be automatically acquired and stitched together to form a single large image. This is very useful for scanning large areas of the surface of the sample quickly for difficult to find features or locating corners of a small chip.
- **Virtual mask aligner:** in this feature the pattern to be exposed is overlaid onto the real time video microscope window so that the user can see precisely what will be exposed in the region of the wafer currently under the microscope. This gives the same operational feel as a traditional mask aligner, where both the mask and the wafer are seen together through a microscope. It is particularly useful when using the MicroWriter ML[®]2 to pattern electrical contacts onto irregular objects such as single flakes of graphene and the user needs to be sure that the exposed contact pads will overlap the edges of the flake. A related software feature allows the user to export a snapshot of the microscope as a graphics file which can then be loaded into a simple 3rd party graphics package and the desired exposure drawn directly onto the image. The file is then re-imported into the MicroWriter ML[®]2 and the

system extracts the desired exposure from the file and exposes it.

- **Equipment sharing logger:** the MicroWriter ML[®]2 keeps a log of the time spent using the machine by different logged-in users. A table can be exported showing the total usage time of all registered users. This enables billing and auditing in an environment where laboratory equipment is shared between users or projects.

MicroWriter ML[®]2 and Electron Beam Lithography

Most devices fabricated by electron beam lithography only need the high resolution of the electron beam for a small part of the device. The majority of the exposure time often comes from large structures such as electrical contacts. The MicroWriter ML[®]2 can be used in a mixed-mode lithography process where the expensive beam time of the electron beam lithography is used only for the smallest structures and the cheaper MicroWriter ML[®]2 is used for the larger structures. Advanced alignment features within the MicroWriter ML[®]2 allow the two processes to be aligned to each other, even if they have slightly differently calibrated coordinate systems. The MicroWriter ML[®]2 is therefore equally suited to R&D environments which already have electron beam lithography. Figure 10 shows an example of mixed-mode lithography where 100 μm wide crosses (2 μm line width) were fabricated across a wafer using electron beam lithography and gold metallisation and then sets of eight 10 μm wide boxes were overwritten using a MicroWriter ML[®]2 to align precisely with the tips of the cross.

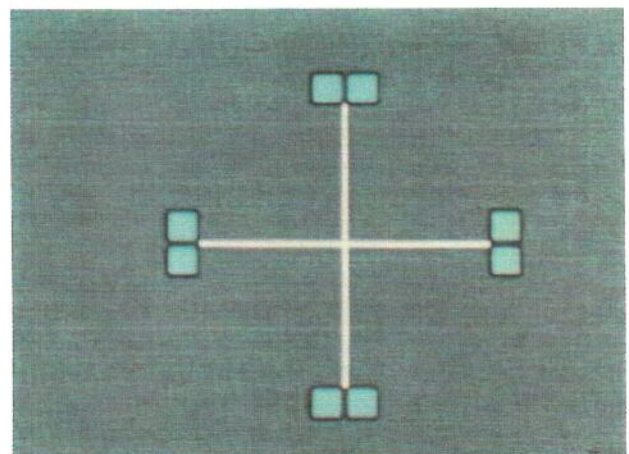


Figure 10: Combining electron beam lithography and the MicroWriter ML[®]2



MicroWriter ML[®]2

Laser lithography system specifications

System options

OPT-UV: adds a 375nm UV laser (user to specify focused spot size in range 1µm-5µm at time of order) which allows shorter wavelength resists such as SU-8 to be exposed.

OPT-IR: adds an Infra-Red Scanning Laser Microscope (2µm resolution, wavelength 1550nm). Silicon is transparent at this wavelength, allowing the microscope to view existing metal structures on the reverse side of a double-polished wafer. This allows exposed structures on both the top and the bottom of the wafer to be aligned. This is particularly useful in MEMS experiments where etching through from one side of the wafer to the other may be performed.

Standards

The MicroWriter ML[®]2 conforms to EN61326 and is CE marked.

Service requirements

- 110–240 VAC 50–60 Hz 8 A single phase.
- An optical microscope for inspecting samples and dry nitrogen duster for drying samples are recommended.

Energy usage

- **Maximum energy usage:** 450 W
- **Stand-by energy usage** (PC hibernating, all other modules operating): 160 W

Environmental requirements

- Room temperature 15–25 °C.
- Room temperature stability ± 5 °C across 24 hours.
- It is recommended to place the vacuum wafer chuck pump outside of the room in a service corridor because of its noise and vibration.

Base system contents

- XYZ motor with high speed 19" rack mounted controller.
- 200 mm wafer stage with vacuum chuck and pump.
- Software-based rotation correction.
- 0.6 µm resolution 405 nm wavelength long-life semiconductor laser writer with through-the-lens optical reflection detector for autocalibration.
- 1 µm resolution 405 nm wavelength long-life semiconductor laser writer with through-the-lens optical reflection detector for autocalibration.
- Eight 5 µm resolution 405 nm wavelength long-life lasers arranged as a 'turbo' writer with through-the-lens optical reflection detector for autocalibration.
- 690 nm Scanning Laser Microscope (SLM) with through-the-lens optical reflection detector and 2 µm resolution.
- x5 real time video alignment microscope with red light illumination.
- x40 real time video alignment microscope with red light illumination.
- Advanced autofocus system using 690 nm long-life semiconductor laser.
- Focus Lock function for keeping the writing laser in focus while exposing samples with varying thickness.
- Autocalibration software and precision glass calibration disk.
- Temperature-stabilised, light-controlling environmental chamber.
- Passive vibration isolation.
- 64-bit Windows 8 GB 19" rack mounted PC.
- Windows-based MicroWriter ML[®]2 control software, including wafer inspection tool, surface profilometer tool, automatic marker detection and correction tool, wide field viewer, virtual mask aligner and equipment sharing logger.
- Remote access client software to allow technical support.
- Clewin 5 mask design software.



MicroWriter ML[®]2

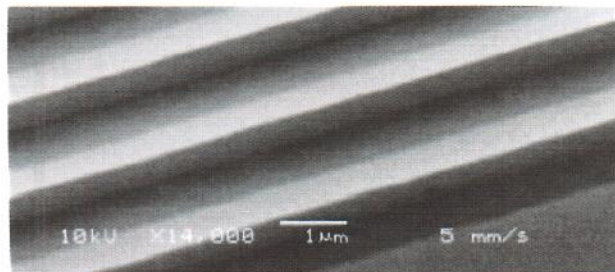
Laser lithography system specifications

Picture gallery

The following electron micrographs show structures that have been fabricated using a MicroWriter ML[®]2.



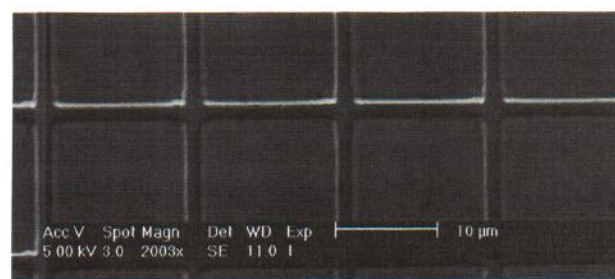
Microwriting



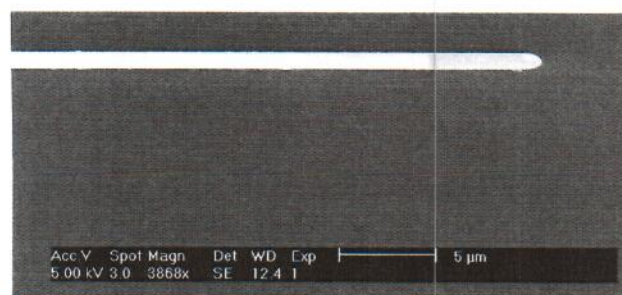
0.6 μ m diameter holes on 3 μ m pitch



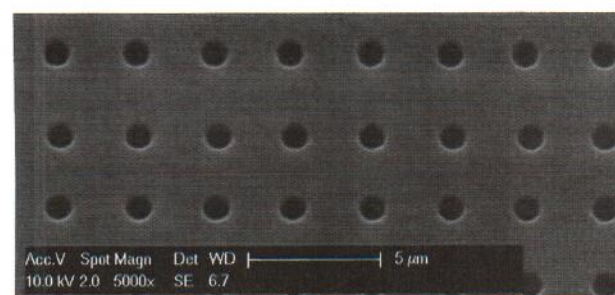
5 μ m checkerboard



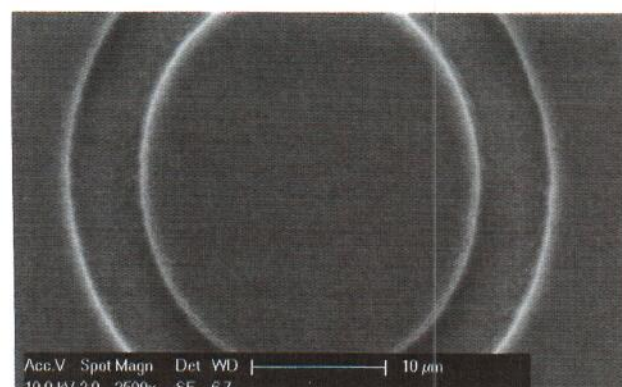
Cross-point trenches



Single pixel line with 1 μ m 405nm beam; after metallisation



1 μ m wide trenches on 2 μ m pitch



Annular ring (super quality)



Micromusic

MicroWriter 2 Specifications

- 1 μ m resolution 405nm laser writer with 690nm imaging laser and through the lens reflection detector for scanning laser microscopy and system calibration.
- 0.6 μ m resolution 405nm laser writer with through the lens reflection detector for system calibration.
- 8 x 5 μ m resolution 405nm lasers focused through a single lens with through the lens reflection detector for system calibration.
- 1 μ m resolution 375 nm laser writer for best performance with e.g. SU-8 resists
- Real time CCD video camera with red LED illumination and x5 microscope objective for wide field viewing of sample surface.
- Real time CCD video camera with red LED illumination and high resolution microscope objective (x40 effective magnification) for high accuracy alignment to existing features on sample surface.
- The fields of view of the different microscopes are as follows:
x5 real time video microscope (no digital zoom): 1.1mm x 0.9mm
x40 real time video microscope (no digital zoom): 130 μ m x 80 μ m
SLM: 50 μ m – 2000 μ m (user selectable by rotating the mouse wheel)
Both real time video microscopes have in addition a x4 digital zoom.
- The two systems allow alignment of the exposed pattern to existing features on the wafer within $\pm 1 \mu\text{m}$ (3σ) accuracy.
- Temperature stabilised enclosure (+/- 1°C)
- Passive vibration isolation table
- Electrical 19" control rack with motion controller and PC (rack sits underneath optical table)
- Alignment target for calibration
- Control software
- Vacuum pump including extension pipework to allow pump to be located in separate room (customer's responsibility)
- Delivery and commissioning
- 1.5 days of user training and acceptance testing
- **2 years** of fully comprehensive warranty (all parts, labour, travel and subsistence) for complete system, including any options.
- **5 years** of fully comprehensive warranty (all parts, labour, travel and subsistence) for 405 nm laser diodes. Excludes damage caused by lightning strikes to building or surroundings or other abnormal power surges.
- Lifetime free software upgrades (providing the hardware supports new software features)

- Writing speeds (assuming a full-area exposure across 150mm x 150mm in standard quality raster mode):

Laser resolution	Areal writing speed
1 μm	4 $\text{mm}^2/\text{minute}$
0.6 μm	2 $\text{mm}^2/\text{minute}$
5 μm (operating as a single laser)	16 $\text{mm}^2/\text{minute}$
5 μm (8 lasers in parallel – ‘turbo’ mode)	180 $\text{mm}^2/\text{minute}$

- Wafers up to 230mm x 230mm in size can be accommodated.
- Up to 195mm x 195mm writing area with full accuracy
- There is no minimum size or shape – even sub-millimeter fragments can be accommodated.
- System can cope with bowed, wedged or structured wafers and fragments.
- Maximum sample thickness = 15mm.
- Multi-wafer software tool allows multiple chips or wafers
- No edge exclusion region.
- Samples are held in place using a vacuum chuck
- Autofocusing and wedge / bow correction are performed before exposure.
- An automatic flattening system allows thickness measurements to be made at regular intervals along the x- and y-axes of the sample and any bow (quadratic fitting function) or wedge (linear fitting function) to be identified.
- System contains full single-pass greyscale electronics with 256 physical grey
- Surface profiling
- Automatic device inspection
- System supports x-raster, y-raster and vector mode exposures.
- Different jobs in the exposure job list can be assigned different exposure modes.
- ‘wide field viewer’ function which allows a large number of microscope images to be automatically recorded at different locations and then stitched together to form a very wide field of view.
- A ‘job list builder’ tool allows arrays of exposures to be automatically generated.
- Dose-gradients and focus gradients can be applied along the x- and y-axes of the array.