

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

PCT/US18/46527
International Application No.

13 August 2018 (13.08.2018)
International Filing Date

PCT
Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) TI-78820WO

Box No. I TITLE OF INVENTION	
CONCURRENT USE OF MULTIPLE PROTOCOLS ON A SINGLE RADIO	
Box No. II APPLICANT <input type="checkbox"/> This person is also inventor	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)	Telephone No. 214-479-1264
TEXAS INSTRUMENTS INCORPORATED P. O. BOX 655474, Mail Station 3999 Dallas, Texas 75265-5474 US	Facsimile No. 214-567-2228
	Applicant's registration No. with the Office 23494
E-mail authorization: Marking one of the check-boxes below authorizes the receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority to use the e-mail address indicated in this Box to send, notifications issued in respect of this international application to that e-mail address if those offices are willing to do so. <input type="checkbox"/> as advance copies followed by paper notifications; or <input checked="" type="checkbox"/> exclusively in electronic form (no paper notifications will be sent). E-mail address: uspto@ti.com	
State (that is, country) of nationality: US	State (that is, country) of residence: US
This person is applicant for the purposes of: <input checked="" type="checkbox"/> all designated States <input type="checkbox"/> the States indicated in the Supplemental Box	
Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
<input checked="" type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.	
Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	<input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	Telephone No. 214-479-1264
TEXAS INSTRUMENTS INCORPORATED DAVIS, Jr., Michael A. P. O. Box 655474, Mail Station 3999 Dallas, Texas 75265-5474 US	Facsimile No. 214-567-2228
	Agent's registration No. with the Office 35488
E-mail authorization: Marking one of the check-boxes below authorizes the receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority to use the e-mail address indicated in this Box to send, notifications issued in respect of this international application to that e-mail address if those offices are willing to do so. <input type="checkbox"/> as advance copies followed by paper notifications; or <input checked="" type="checkbox"/> exclusively in electronic form (no paper notifications will be sent). E-mail address: uspto@ti.com	
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.	

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
<i>If none of the following sub-boxes is used, this sheet should not be included in the request.</i>	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p> <p>TEXAS INSTRUMENTS JAPAN LIMITED 24-1, Nishi-Shinjuku 6-chome Shinjuku-ku Tokyo 160-8366 JP</p>	<p>This person is:</p> <p><input checked="" type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p> <p>Applicant's registration No. with the Office</p>
State <i>(that is, country)</i> of nationality: JP	State <i>(that is, country)</i> of residence: JP
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> the States indicated in the Supplemental Box	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p> <p>KANDHALU RAGHU, Arvind 3416 Nickel Creek Drive Plano, TX 75025 US</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input checked="" type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p> <p>Applicant's registration No. with the Office</p>
State <i>(that is, country)</i> of nationality:	State <i>(that is, country)</i> of residence:
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> the States indicated in the Supplemental Box	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p> <p>CAVE, Antony James 39 Goodes Lane, Syston Leicester, UK. LE7 2JL UK</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input checked="" type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p> <p>Applicant's registration No. with the Office</p>
State <i>(that is, country)</i> of nationality:	State <i>(that is, country)</i> of residence:
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> the States indicated in the Supplemental Box	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p> <p>VEDANTHAM, Ramanuja 959 Pelican Drive Allen, TX 75013 US</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input checked="" type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p> <p>Applicant's registration No. with the Office</p>
State <i>(that is, country)</i> of nationality:	State <i>(that is, country)</i> of residence:
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> the States indicated in the Supplemental Box	
<input checked="" type="checkbox"/> Further applicants and/or (further) inventors are indicated on another continuation sheet.	

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

ZHANG, Xiaoxi Bruce
4013 Sunflower Lane
Plano, TX 75024
US

This person is:

- applicant only
- applicant and inventor
- inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:

all designated States

the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:

- applicant only
- applicant and inventor
- inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:

all designated States

the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:

- applicant only
- applicant and inventor
- inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:

all designated States

the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:

- applicant only
- applicant and inventor
- inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of:

all designated States

the States indicated in the Supplemental Box

Further applicants and/or (further) inventors are indicated on another continuation sheet.

Supplemental Box

If the Supplemental Box is not used, this sheet should not be included in the request.

1. If, in any of the Boxes, except Boxes Nos. VIII(i) to (v) for which a special continuation box is provided, **the space is insufficient** to furnish all the information: in such case, write "Continuation of Box No." (indicate the number of the Box) and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:

(i) **if more than one person is to be indicated as applicant and/or inventor** and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;

(ii) if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "**the States indicated in the Supplemental Box**" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;

(iii) if, in Box No. II or in any of the sub-boxes of Box No. III, **the inventor or the inventor/applicant is not inventor for the purposes of all designated States**: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;

(iv) if, in addition to the agent(s) indicated in Box No. IV, there are **further agents**: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;

(v) if, in Box No. VI, there are **more than three earlier applications whose priority is claimed**: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI.

2. If the applicant intends to make an indication of the wish that the international application be treated, in certain designated States, as an application for a patent of addition, certificate of addition, inventor's certificate of addition or utility certificate of addition: in such case, write the name or two-letter code of each designated State concerned and the indication "**patent of addition**," "**certificate of addition**," "**inventor's certificate of addition**" or "**utility certificate of addition**," the number of the parent application or parent patent or other parent grant and the date of grant of the parent patent or other parent grant or the date of filing of the parent application (Rules 4.11(a)(i) and 49bis.1(a) or (b)).

3. If the applicant intends to make an indication of the wish that the international application be treated, in the United States of America, as a continuation or continuation-in-part of an earlier application: in such case, write "United States of America" or "US" and the indication "**continuation**" or "**continuation-in-part**" and the number and the filing date of the parent application (Rules 4.11(a)(ii) and 49bis.1(d)).

1. (ii) Continuation of Box No. III

TEXAS INSTRUMENTS JAPAN LIMITED: This person is applicant for the purposes of JP (Japan).

1. (iv) Continuation of Box No. IV

Gregory Albin (Reg. No. 56292)

P. O. Box 655474, MS 3999

Dallas, Texas 75265-5474

US

--and--

ALL OTHER REPRESENTATIVES AT CUSTOMER NO. 23494

3. US: This application is a continuation of Application No. US 16/101,121 filed 10 AUGUST 2018, which claims the benefit of Provisional Application No. US 62/544,439 filed 11 AUGUST 2017, the entireties of both of which are incorporated herein by reference.

Box No. V DESIGNATIONS

The filing of this request constitutes under Rule 4.9(a) the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.

However,

- DE Germany is **not designated** for any kind of national protection
- JP Japan is **not designated** for any kind of national protection
- KR Republic of Korea is **not designated** for any kind of national protection

(The check-boxes above may only be used to exclude (irrevocably) the designations concerned if, at the time of filing or subsequently under Rule 26bis.1, the international application contains in Box No. VI a priority claim to an earlier national application filed in the particular State concerned, in order to avoid the ceasing of the effect, under the national law, of this earlier national application.)

Box No. VI PRIORITY CLAIM AND DOCUMENT

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application <i>(day/month/year)</i>	Number of earlier application	Where earlier application is:		
		national application: country or Member of WTO	regional application: regional Office	international application: receiving Office
item (1) 11 AUGUST 2017 (11.08.2017)	62/544,439	US		
item (2) 10 AUGUST 2018 (10.08.2018)	16/101,121	US		
item (3)				

- Further priority claims are indicated in the Supplemental Box.

Furnishing the priority document(s):

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application(s) was filed with the receiving Office which, for the purposes of this international application, is the receiving Office)* identified above as:

- all items item (1) item (2) item (3) other, see Supplemental Box

The International Bureau is requested to obtain from a digital library a certified copy of the earlier application(s) identified above, using, where applicable, the access code(s) indicated below *(if the earlier application(s) is available to it from a digital library)*:

- item (1) access code _____ item (2) access code _____ item (3) access code _____ other, see Supplemental Box

Restore the right of priority: the receiving Office is requested to restore the right of priority for the earlier application(s) identified above or in the Supplemental Box as item(s) (_____). *(See also the Notes to Box No. VI; further information must be provided to support a request to restore the right of priority.)*

Incorporation by reference: where an element of the international application referred to in Article 11(1)(iii)(d) or (e) or a part of the description, claims or drawings referred to in Rule 20.5(a) is not otherwise contained in this international application but is completely contained in an earlier application whose priority is claimed on the date on which one or more elements referred to in Article 11(1)(iii) were first received by the receiving Office, that element or part is, subject to confirmation under Rule 20.6, incorporated by reference in this international application for the purposes of Rule 20.6.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if more than one International Searching Authority is competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):*

ISA/ RU _____

Box No. VIII (ii) DECLARATION: ENTITLEMENT TO APPLY FOR AND BE GRANTED A PATENT

The declaration must conform to the standardized wording provided for in Section 212; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (ii). If this Box is not used, this sheet should not be included in the request.

Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51bis.1(a)(ii)), in a case where the declaration under Rule 4.17(iv) is not appropriate:

In relation to this international application,

TEXAS INSTRUMENTS INCORPORATED is entitled to apply for and be granted a patent by virtue of the following:

an assignment from

KANDHALU RAGHU, Arvind to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

CAVE, Antony James to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

VEDANTHAM, Ramanuja to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

and

ZHANG, Xiaoxi Bruce to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018.

This declaration is continued on the following sheet, "Continuation of Box No. VIII (ii)".

Continuation of Box No. VIII (i) to (v) DECLARATION

If the space is insufficient in any of Boxes Nos. VIII (i) to (v) to furnish all the information, including in the case where more than two inventors are to be named in Box No. VIII (iv), in such case, write "Continuation of Box No. VIII ..." (indicate the item number of the Box) and furnish the information in the same manner as required for the purposes of the Box in which the space was insufficient. If additional space is needed in respect of two or more declarations, a separate continuation box must be used for each such declaration. If this Box is not used, this sheet should not be included in the request.

Continuation of Box No. VIII (ii)

DECLARATION: ENTITLEMENT TO APPLY FOR AND BE GRANTED A PATENT

Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51bis.1(a)(ii)), in a case where the declaration under Rule 4.17(iv) is not appropriate:

In relation to this international application,

TEXAS INSTRUMENTS JAPAN LIMITED is entitled to apply for and be granted a patent by virtue of the following:

an assignment from

KANDHALU RAGHU, Arvind to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

CAVE, Antony James to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

VEDANTHAM, Ramanuja to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

and

ZHANG, Xiaoxi Bruce to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

and

transfer of entitlement from TEXAS INSTRUMENTS INCORPORATED to TEXAS INSTRUMENTS JAPAN LIMITED by way of assignment of joint ownership interest of the Japan patent rights, dated on or before 11 AUGUST 2018.

Box No. VIII (iii) DECLARATION: ENTITLEMENT TO CLAIM PRIORITY

The declaration must conform to the standardized wording provided for in Section 213; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iii). If this Box is not used, this sheet should not be included in the request.

Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application specified below, where the applicant is not the applicant who filed the earlier application or where the applicant's name has changed since the filing of the earlier application (Rules 4.17(iii) and 51bis.1(a)(iii)):

In relation to this international application,

TEXAS INSTRUMENTS INCORPORATED is entitled to claim priority of earlier Application No. US 16/101,121 filed 10 AUGUST 2018 and Provisional Application No. US 62/544,439 filed 11 AUGUST 2017 by virtue of the following:

an assignment from

KANDHALU RAGHU, Arvind to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

CAVE, Antony James to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

VEDANTHAM, Ramanuja to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

and

ZHANG, Xiaoxi Bruce to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018.

This declaration is continued on the following sheet, "Continuation of Box No. VIII (iii)".

Continuation of Box No. VIII (i) to (v) DECLARATION

If the space is insufficient in any of Boxes Nos. VIII (i) to (v) to furnish all the information, including in the case where more than two inventors are to be named in Box No. VIII (iv), in such case, write "Continuation of Box No. VIII ..." (indicate the item number of the Box) and furnish the information in the same manner as required for the purposes of the Box in which the space was insufficient. If additional space is needed in respect of two or more declarations, a separate continuation box must be used for each such declaration. If this Box is not used, this sheet should not be included in the request.

Continuation of Box No. VIII (iii)

DECLARATION: ENTITLEMENT TO CLAIM PRIORITY

Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application specified below, where the applicant is not the applicant who filed the earlier application or where the applicant's name has changed since the filing of the earlier application (Rules 4.17(iii) and 51bis.1(a)(iii)):

In relation to this international application,

TEXAS INSTRUMENTS JAPAN LIMITED is entitled to claim priority of earlier Application No. US 16/101,121 filed 10 AUGUST 2018 and Provisional Application No. US 62/544,439 filed 11 AUGUST 2017 by virtue of the following:

an assignment from

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CAVE, Antony James to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

VEDANTHAM, Ramanuja to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

and

ZHANG, Xiaoxi Bruce to TEXAS INSTRUMENTS INCORPORATED dated 09 AUGUST 2018;

and

transfer of entitlement from TEXAS INSTRUMENTS INCORPORATED to TEXAS INSTRUMENTS JAPAN LIMITED by way of assignment of joint ownership interest of the Japan patent rights, dated on or before 11 AUGUST 2018.

Box No. IX CHECK LIST for EFS-Web filings - this sheet is only to be used when filing an international application with RO/US via EFS-Web

This international application contains the following:	Number of sheets	This international application is accompanied by the following item(s) (mark the applicable check-boxes below and indicate in right column the number of each item):	Number of items
(a) request form PCT/RO/101 (including any declarations and supplemental sheets)	11	1. <input type="checkbox"/> fee calculation sheet	:
(b) description (excluding any sequence listing part of the description, see (f), below)	10	2. <input type="checkbox"/> original separate power of attorney	:
(c) claims	3	3. <input type="checkbox"/> original general power of attorney	:
(d) abstract	1	4. <input type="checkbox"/> copy of general power of attorney; reference number:	:
(e) drawings (if any)	4	5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s)	:
(f) sequence listing part of the description in the form of an image file (e.g. PDF)		6. <input type="checkbox"/> Translation of international application into (language):	:
Total number of sheets (including the sequence listing part of the description if filed as an image file)	29	7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material	:
(g) sequence listing part of the description		8. <input type="checkbox"/> (only where item (f) is marked in the left column) copy of the sequence listing in electronic form (Annex C/ST.25 text file) not forming part of the international application but furnished only for the purposes of international search under Rule 13ter.	:
<input type="checkbox"/> filed in the form of an Annex C/ST.25 text file		9. <input type="checkbox"/> (only where item (f) is marked in the left column) a statement confirming that "the information recorded in electronic form submitted under Rule 13ter is identical to the sequence listing as contained in the international application" as filed via EFS-Web:	:
<input type="checkbox"/> WILL BE filed separately on physical data carrier(s), on the same day and in the form of an Annex C/ST.25 text file		10. <input type="checkbox"/> copy of results of earlier search(es) (Rule 12bis.1(a))	:
Indicate type and number of physical data carrier(s)		11. <input type="checkbox"/> other (specify):	:

Figure of the drawings which should accompany the abstract: 4 Language of filing of the international application: English

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE
 Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

TEXAS INSTRUMENTS INCORPORATED
 /michael a. davis, jr./ _____ Agent
 Michael A. Davis, Jr., Reg. No. 35488

For receiving Office use only	
1. Date of actual receipt of the purported international application:	13 August 2018 (13.08.2018)
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority (if two or more are competent): ISA / RU	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid

2. Drawings:
 received:
 not received:

For International Bureau use only
 Date of receipt of the record copy by the International Bureau: