

Proposal for addition of mask work symbol

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Introduction

The mask work symbol is an M in a circle, used for intellectual property protection of integrated circuits. This symbol is analogous to C in a circle for copyright, P in a circle for phonorecord copyright, and R in a circle for registered trademarks. While the latter symbols are all defined in Unicode, there is no symbol specifically for the mask work. Although the Unicode CIRCLED LATIN CAPITAL LETTER M can be used, a separate symbol for mask work would be beneficial.

This symbol was introduced by The Semiconductor Chip Protection Act of 1984¹, which provided intellectual property protection for integrated circuit layouts (mask works). This protection is indicated by the words *mask work*, the symbol *M* or an M in a circle.

Unicode currently has a set of intellectual property symbols, but lacks mask work:

COPYRIGHT SIGN	U+00A9	©
REGISTERED SIGN	U+00AE	®
SOUND RECORDING COPYRIGHT	U+2117	Ⓟ
SERVICE MARK	U+2120	SM
TRADE MARK SIGN	U+2122	™
CIRCLED WZ	U+1F12E	Ⓜ
COPYLEFT SYMBOL	U+1F12F	Ⓜ
MC SIGN, RAISED	U+1F16A	MC
MD SIGN, RAISED	U+1F16B	MD

¹ 17 U.S.C. §§ 901-914

Examples

Use in books

Copyright Law of the United States and Related Laws Contained in Title 17 of the United States Code, Dec 2011, Government Printing Office, page 226:

(1) the words “mask work”, the symbol *M*, or the symbol  (the letter M in a circle); and

Encyclopedia of Microcomputers: Volume 3 – CompuServe to Computer Programs: Outliners, page 324:

To secure the protections afforded by the Act, the owner of a mask work places on the semiconductor chips containing the mask work a notice that the mask work is protected under the Act. The notice consists of 1) either the words “mask work” or a designated symbol and 2) the name of the owner. The symbol must be either an “*M*” or the letter M in a circle, . The notice may be put either on the mask work itself or on

The Michigan Bar Journal, Volume 65, Part 1, page 312:

consist of the words “mask force,” the symbol *M*, or the “circle-M” symbol , plus either the name of the

Use in PDF documents

[Form MW, Copyright Office:](#)

notice consists of two elements: 1) the words “mask work,” the symbol *M*, or the letter M in a circle ; and 2) the name of the owner or owners of the

[Federal Statutory Protection for Mask Works:](#)

the words *mask work*, the symbol *M* or the symbol ;
and

Worldwide [scientific collaboration and national intellectual property:how to put those things together?](#):

work as a two or three-dimensional layout or topography of an integrated circuit, i.e. transistors and passive electronic components such as resistors and interconnections, may be protected by exclusive rights “mask work” 

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Use in web pages

The mask work symbol is used in various web pages. For example,²

How do I affix a notice including the ® symbol? An appropriate notice on a semiconductor chip or product includes either the words "Mask Work," the symbol *M*, or the symbol ®, followed by the

Wikipedia³

An **official mark** (sometimes denoted by the symbols ^{OM}, M, or ®) is a form of **intellectual property** which exists in [Canada](#) under section 9 of the [Trade-marks](#)

IT Law Wiki⁴:

The non-obligatory symbol used in a **mask work notice** is ® ("M" enclosed in a circle) or *M*.

Instead of using the mask work symbol, some web pages just write out the text "M in a circle."⁵

1. The words mask work, the symbol *M* or the symbol (M in a circle); and

Use in physical chips

One interesting application of the mask work symbol is its use on the physical packages of integrated circuits, such as this Apple chip.⁶

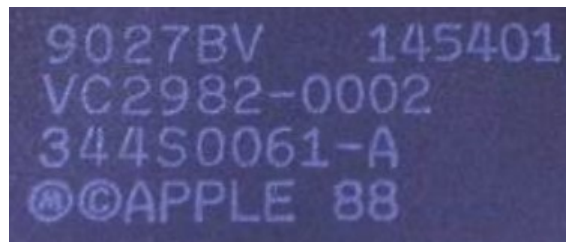
2 <http://www.patentstation.com/mdm/p141.htm>

3 https://en.wikipedia.org/wiki/Official_mark

4 https://itlaw.wikia.com/wiki/Mask_work_notice

5 <http://www.wafer-bumping.com/documents/about/ip.html>

6 <https://siliconpr0n.org/archive/doku.php?id=mcmaster:apple:344s0061-a>



The symbol also appears microscopically on integrated circuit dies ⁷. (The hexagonal shape is due to line drawing constraints.)



The suggested glyph

The glyph should be similar to the existing © ® ® glyphs in size and position. The M typically does not touch the circle, unlike most implementations of M ENCLOSED IN A CIRCLE.



A TTF font with this character as U+E000 is available.⁸

Properties

The proposed [properties](#) for the new symbols are:

⁷ <https://siliconpr0n.org/archive/doku.php?id=mcmaster:cbm:65ce02-r2> and <https://siliconpr0n.org/archive/doku.php?id=mcmaster:intel:80486dx>

⁸ https://drive.google.com/file/d/1IEj-_R9KAkY2Y3s73-icDMzL1PQ3njiv/view?usp=sharing

1F16C;MASK WORK SYMBOL;So;0;ON;;;;;N;;;;;

These properties match the properties for COPYRIGHT SIGN, SOUND RECORDING SIGN and REGISTERED SIGN.

Range: Enclosed Alphanumeric Supplement. This range currently holds the semantically related COPYLEFT as well as RAISED MC SIGN and RAISED MD SIGN and CIRCLED WZ (for German "Warenzeichen" = trade mark).

Can an existing Unicode symbol be used?

One option is to use the existing Unicode  (M enclosed in a circle; Unicode code point U+24C2); web pages often use this symbol. However, several reasons motivate the introduction of a new Unicode symbol.

The mask work sign has a semantic meaning separate from M enclosed in a circle. As with the related copyright and trademark symbols, using a separate symbol has benefits for searching.

Second, in most fonts the M enclosed in a circle symbol has a different appearance from the related copyright signs (usually larger and touching the circle), making it look out of place:

Arial:    

Courier:    

Geneva:    

Noto Sans:    

Twitter replaces the M in a circle with a "Metro" emoji which makes it unusable:



Third, adding the mask work symbol fills in the set of intellectual property symbols. This provides consistency with the other symbols.

Fourth, the lack of a specific mask work code point leads to errors. For instance, the government copyright site⁹ uses a μ (*mu*) instead of an M in a circle¹⁰:

(b) The notice referred to in subsection (a) shall consist of—

(1) the words “mask work”, the symbol “M”, or the symbol μ (the letter M in a circle); and

Conclusion

Looking at the Unicode [Criteria for Encoding Symbols](#), the mask work symbol is a good fit for addition to Unicode. It occurs in running text, has a well defined user community, always occurs together with text, should be searchable, and it completes a class of intellectual property symbols already in the standard.

⁹ <https://www.copyright.gov/title17/92chap9.html>

¹⁰ They used a PDF font with a mask work symbol assigned to μ and apparently ran into problems generating the HTML page. A genuine Unicode mask work symbol would prevent this problem.

**ISO/IEC JTC 1/SC 2/WG 2
PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646¹**

Please fill all the sections A, B and C below.

Please read Principles and Procedures Document (P & P) from <http://std.dkuug.dk/JTC1/SC2/WG2/docs/principles.html> for guidelines and details before filling this form.

Please ensure you are using the latest Form from <http://std.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html>.

See also <http://std.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html> for latest Roadmaps.

A. Administrative

1. Title:	Proposal for addition of mask work symbol		
2. Requester's name:	Ken Shirriff		
3. Requester type (Member body/Liaison/Individual contribution):	individual		
4. Submission date:	12/16/2018		
5. Requester's reference (if applicable):			
6. Choose one of the following:			
This is a complete proposal:	X		
(or) More information will be provided later:			

B. Technical – General

1. Choose one of the following:			
a. This proposal is for a new script (set of characters):		No	
Proposed name of script:			
b. The proposal is for addition of character(s) to an existing block:		Yes	
Name of the existing block:		Enclosed Alphanumeric Supplement	
2. Number of characters in proposal:		1	
3. Proposed category (select one from below - see section 2.2 of P&P document):			
A-Contemporary	X	B.1-Specialized (small collection)	
C-Major extinct		B.2-Specialized (large collection)	
D-Attested extinct		E-Minor extinct	
F-Archaic Hieroglyphic or Ideographic		G-Obscure or questionable usage symbols	
4. Is a repertoire including character names provided?		Yes	
a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document?		Yes	
b. Are the character shapes attached in a legible form suitable for review?		Yes	
5. Fonts related:			
a. Who will provide the appropriate computerized font to the Project Editor of 10646 for publishing the standard?		Ken Shirriff, see text	
b. Identify the party granting a license for use of the font by the editors (include address, e-mail, ftp-site, etc.):		public domain font	
6. References:			
a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?		Yes	
b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?		Yes	
7. Special encoding issues:			
Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)?		n/a	

8. Additional Information:

Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at <http://www.unicode.org> for such information on other scripts. Also see Unicode Character Database (<http://www.unicode.org/reports/tr44/>) and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

¹ Form number: N4502-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10, 2007-03, 2008-05, 2009-11, 2011-03, 2012-01)

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before?	No
If YES explain	
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)?	No
If YES, with whom?	
If YES, available relevant documents:	
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included?	Yes
Reference: see text	
4. The context of use for the proposed characters (type of use; common or rare)	common
Reference: see text	
5. Are the proposed characters in current use by the user community?	Yes
If YES, where? Reference: see text	
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?	No
If YES, is a rationale provided?	
If YES, reference:	
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?	n/a
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence?	Yes
If YES, is a rationale for its inclusion provided?	
If YES, reference: see text	
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters?	No
If YES, is a rationale for its inclusion provided?	
If YES, reference:	
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to, or could be confused with, an existing character?	Yes
If YES, is a rationale for its inclusion provided?	
If YES, reference: see text	
11. Does the proposal include use of combining characters and/or use of composite sequences?	No
If YES, is a rationale for such use provided?	
If YES, reference:	
Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?	n/a
If YES, reference:	
12. Does the proposal contain characters with any special properties such as control function or similar semantics?	No
If YES, describe in detail (include attachment if necessary)	
13. Does the proposal contain any Ideographic compatibility characters?	No
If YES, are the equivalent corresponding unified ideographic characters identified?	
If YES, reference:	