Intel Sues C&T for Patent Infringement

A Preview of What Future 386-Compatible Makers Will Face

By Michael Slater

Just days after the final arbitration ruling in Intel's five-year dispute with AMD, Intel began its attack on Chips and Technologies, the second company to announce 386-compatible microprocessors. The issues are entirely different from those AMD has faced; C&T's chips do not use Intel's microcode, and Intel has not made any copyright infringement claims. AMD, on the other hand, has a patent cross-license agreement with Intel, so patent infringement was not an issue.

Intel filed two separate suits on February 28, one with regard to C&T's 387-compatible math coprocessor and one for C&T's Super386 microprocessor line. The 386 suit also names C&T's PC/Chip integrated processor, even though this device has an 8086-type processor core and therefore seems not to be affected by most of the patents asserted by Intel.

Intel has sought:

- A preliminary and permanent injunction enjoining C&T from continuing the alleged infringement.
- In the case of the math coprocessors, a preliminary injunction requiring C&T to place 50% of its revenue from these products in an escrow account.
- A temporary restraining order (which has been denied) and a preliminary and permanent injunction preventing C&T from transferring to any other company any aspect of the allegedly infringing designs.
- Preliminary and permanent injunctions requiring C&T to retrieve any design information already transferred to a third party.
- A permanent injunction requiring C&T to destroy the masks, drawings, and other records of the allegedly infringing designs.
- Damages for the alleged infringement, plus treble damages because of allegedly willful infringement.
- Court costs and attorney's fees.

In addition, Intel has asked for a declaratory judgment that its 386SL does not infringe four C&T patents (numbers 4,899,272; 4,924,375; 5,051,889; and 5,040,153), and that the patents are invalid and unenforceable because C&T offered the technology for sale more than one year before filing the patent applications. As of this writing, C&T has not filed suit against Intel; these patents presumably came up during negotiations that the two companies held prior to Intel's filing of the lawsuit. Intel's complaint states that "the C&T patents exist as a cloud over Intel's ability to make,

use, and sell microprocessors of the type asserted by C&T to infringe those patents, and Intel is in reasonable apprehension that C&T will take legal action against Intel."

The temporary restraining order (TRO) was denied on March 9. The court appointed a "special master" to collect information from both parties and report back to the court in 60 days, and a hearing on the preliminary injunction is expected in May or June.

As part of the TRO hearing, Texas Instruments asked to intervene, essentially volunteering to join C&T as a defendant in the suit, and the judge allowed this intervention despite strenuous objections by Intel's attorney. Texas Instruments became involved because it has been serving as C&T's foundry for the devices, and the lawsuit threatens to block TI's fabrication of the chips. There have been rumors that TI may become a vendor of C&T's processor designs, but for now it is only serving as a foundry to C&T.

The Foundry License Issue

TI's participation brings far greater legal and financial resources to C&T's defense, making it clear that Intel has a serious battle on its hands. Even more importantly, TI has a broad patent cross-license agreement with Intel, and C&T and TI are arguing that this cross-license agreement gives TI the right to fabricate the processors and coprocessors for C&T.

The ability of a foundry customer to be shielded by the foundry's patent licenses is a critical legal issue. Intel is fighting hard to prevent its patent cross-license agreements from being used in this way, since it would essentially nullify the barrier to competition that Intel's patents now represent. Cyrix is attempting to use this same argument to protect its 387-compatible coprocessors, which are fabricated by SGS-Thomson, and it is likely to use the same strategy to attempt to shield its forthcoming 386-compatible microprocessors. The Cyrix/SGS case was tried in January, but the judge has not yet issued a ruling. Intel has already stated its intent to appeal any unfavorable decision.

ULSI System Technology, which uses HP as its foundry, is also attempting to use this defense (see µPR 12/26/91, p. 4). Intel was granted a preliminary injunction against ULSI by U.S. District Court Judge Helen Frye, but the U.S. Court of Appeals for the Federal Circuit (CAFC) stayed this injunction pending appeal, casting doubt on the significance of Frye's ruling. Frye's ruling was based, in part, on the conclusion that HP's

agreement with Intel did not give it the right to sublicense the patents, but the appeals court questioned whether sublicensing was the proper issue. Unlike the C&T/TI case, in which TI has come to C&T's defense, HP has refused to get involved in the ULSI dispute. The CAFC is scheduled to begin hearing ULSI's appeal on April 10, and the outcome of this appeal could set a precedent that will apply to the Cyrix and C&T cases.

Each situation is also different because of the varying language in the agreements, as well as other issues; in the Cyrix/SGS case, for example, Intel has argued that SGS is not entitled to the license at all, which it inherited when it acquired Mostek. The first case to bring the foundry issue to court was an Intel suit against Atmel, in which Atmel was attempting to use its foundry Sanyo's cross-license with Intel to shield itself from Intel's patent infringement claim. The court ruled in Intel's favor, but only became the Intel/Sanyo license specifically licensed Sanyo to use Intel's patents *in Sanyo products*. The HP, SGS, and TI licenses to Intel's patents contain no such restriction.

C&T argues that merely designing the processors cannot constitute patent infringement, since they did not actually make any chips and paper designs are not subject to infringement claims. The only possible infringement comes from making, using, or selling products embodying the patented invention. C&T argues that it is TI that made the chips, and TI is protected by its patent cross license with Intel. TI then sells the chips to C&T, and as long as this transfer is legally accepted as the "first sale" of the device, then no claim of infringement can be brought against C&T for reselling it.

Intel argues that the foundry is really performing a service, so the transfer of chips from the foundry to the chip seller should not constitute a sale. Intel points out that it is C&T's design that infringes, and C&T that is selling the product to customers. The analogy Intel uses is a photo-processing lab: the lab does not own your pictures but is simply providing a processing service. When you buy the processed prints from the lab, this is a sale of the paper they are on, but not of the images themselves.

Intel also asserts that C&T infringed Intel's patents in the development of its processors, since its testing of prototype silicon constitutes "use" of the patents. Some prototypes were fabricated by LSI Logic, which does not have a cross-license agreement with Intel, so the foundry argument does not apply.

The 387 Attack

The math coprocessor suit alleges that C&T's "SuperMath" coprocessors infringe Intel's "Palmer" patent (4,338,675), which is the basis of Intel's existing lawsuits against Cyrix and ULSI Technology and is fundamental to the design of Intel's math coprocessors. Intel

was granted a reissue of this patent last summer that will make it more difficult to challenge the patent's validity, but Cyrix and C&T still intend to do just that.

In C&T's memorandum opposing Intel's TRO request, it outlines the attack it plans on Intel's Palmer patent:

> "Should Intel press its preliminary injunction motion, Chips will prove that the '629 reissue patent is invalid due to obviousness and anticipation in light of prior art, including references that Intel's agents withheld from the Patent and Trademark Office. Chips will also prove that the '629 patent is unenforceable due to the inequitable conduct and fraud before the PTO of those involved in the preparation and prosecution of the reissue '629 patent and its parent, the '675 patent.

> "In particular, Chips will prove that during the prosecution of the parent '675 patent, Intel withheld what was clearly the most relevant prior art reference, despite the fact that this reference was in the possession of John Palmer, one of the inventors, and that it completely anticipated three of the claims which ultimately issued.

> "In addition, Chips will prove that the reissue applicants misrepresented their purpose in prosecuting the reissue, knowingly submitted a declaration containing false statements, mischaracterized the prior art, and concealed the significance of prior art that they buried in a lengthy list of nearly thirty highly technical works submitted to the PTO."

C&T's memorandum also claims that the 387 design (either Intel's or C&T's) does not infringe the patent because it cannot convert all external data formats to an internal format of greater precision. This is a technical argument that ULSI tried to use before Judge Frye, but it failed in that case.

Assuming the Palmer patent is upheld, it appears that it is not possible to produce a math coprocessor that is fully Intel- and IEEE-compatible and does not infringe. Even if the patent is upheld, however, there is at least one workaround. Patent infringement can be avoided by leaving out a feature (relating to the handling of errors and rounding) that is not used by common PC software; this is the course that IIT has taken, and which all coprocessor vendors are likely to take if the patent is upheld. The result will be a modified standard, since software vendors will quickly learn which features are not supported by all coprocessor vendors and will avoid using those features.

The 386-related lawsuit names five Intel patents (see article on p. 13). While no one without access to

and generates a breakpoint signal if a bit is set in a control register. Notice that this circuit does more than a software patch, since it can break on data accesses as well as instruction fetches.

An alternative circuit would, rather than having one comparator determine if there is an exact match, have two comparators checking to see if the virtual address is greater than one limit and less than another, and, if so, generating a breakpoint signal. The bounds for the two comparators would be computed at the time the breakpoint address is loaded, as follows: the greater-than comparator would be fed the breakpoint address minus one, and the less-than comparator would be fed a value depending on the width of the breakpoint address. If the breakpoint address is to an individual byte address, this register would be set to the address plus one. If it is to a word, it would be set to the address plus two, and if to a double word, the address plus four.

Thus, we have achieved compatibility with the 386, but in addition, we have the components in place to set a breakpoint to occur for any access within a range of addresses, rather than for a single address. Also, the comparator described in the patent is used 'to determine a match between two addresses,' while one of the comparators in the workaround solution is to determine if one address is less than the other, and the second comparator determines if one address is greater than another. Since this circuit apparently does not contain at least one of the elements in '944, it would differ substantially.

Other Patents

Among Intel's collection of over 360 U.S. patents, there are several others that appear to relate to the 386 microprocessor. It is not clear why Intel did not assert these patents against C&T. Examples of such patents include:

Patent 4,270,167, filed 6/30/68, issued 5/26/81: "Apparatus and method for cooperative and concurrent coprocessing of digital information." Pertains to the way the 386 and 387 share the local bus and the system bus.

Patent 4,442,484, filed 10/14/80, issued 3/10/84: "Microprocessor memory management and protection mechanism." Describes how the 286, and so the 386, does protected-mode addressing using descriptor tables in memory.

Patent 4,860,195, filed 11/15/88 (continuation of an application filed 2/24/86), issued 8/2/89: "Microprocessor Breakpoint Apparatus." This patent is very similar to patent 5,053,944, which is one of the ones Intel *did* assert against C&T. In fact, '944 is a continuation of an application which itself was a continuation of this patent. ♦

Intel Sues C&T

C&T's detailed internal chip design can determine whether C&T does, in fact, violate these patents, it appears to be possible to work around them. Intel claims, however, that two of the patents—'338, covering the memory management scheme, and '944, covering the breakpoint mechanism—are infringed by any processor that is 386-compatible.

C&T claims to have studied Intel's patents extensively before designing its chips, and it asserts that it does not violate the patents. C&T CEO Gordon Campbell claimed that "Intel's lawsuit is a continuation of its policy to exert a monopoly over the microcomputer industry.... Its latest tactic is to file this legal action in an attempt to delay the adoption of our superior microprocessors by the computer industry."

Conclusions

It is impossible for us to judge, at this point, whether or not C&T's chips do indeed infringe Intel's patents or whether the patents could be invalidated if challenged. For the near term, however, these issues aren't even relevant; the mere act of filing this lawsuit will make it difficult for C&T to get design wins for its microprocessors. C&T may be able to get some customers to use its 38600 devices, which are pin-compatible with Intel's, but the cloud of uncertainty that Intel's legal action puts on the chips is likely to dissuade any major companies from designing systems around C&T's enhanced 38605 chips, which have additional signals and therefore require special support in the system design.

At the recent CeBIT show in Germany, C&T claims that 27 companies announced computers using C&T's Super386 processors. Nearly all of these companies are Taiwanese, however, and none are recognized names, at least in the U.S. market.

The foundry license issue is a critical one for C&T, as it is for Cyrix and USLI. If Intel loses the ULSI appeal, it could set a precedent that would greatly strengthen C&T's defense. If this occurs, an out-of-court settlement seems likely.

The lawsuit comes at an especially difficult time for C&T, which has lost considerable parts of the chip-set business to competitors and has suffered from decreased margins on the chip-set business that it has kept. The new microprocessors and coprocessors are the key to C&T's future, and Intel has placed this future in jeopardy. It is most fortunate for C&T that TI has intervened, since this gives C&T much more legal muscle—and possibly some financial backing—for fighting Intel. ♦