

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte CARY R. CHAMPLIN

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Appeal No. 97-2111  
Application 08/158,345<sup>1</sup>

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ON BRIEF

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Before THOMAS, KRASS and JERRY SMITH, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 20-31. Claims 1-15 were

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<sup>1</sup> Application for patent filed November 29, 1993.

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cancelled as the result of an amendment after final rejection which was entered by the examiner. Claims 16-19 are still pending in this application but stand withdrawn from consideration by the examiner as being directed to a nonelected invention.

The claimed invention pertains to a method and apparatus for operating the Boundary-Scan master of a Boundary-Scan testing apparatus.

Representative claims 20 and 21 are reproduced as follows:

20. A method of operating a Boundary-Scan master coupled to a data and control bus, said method comprising steps of:

determining when an external test (EXTEST) instruction will assert a system action; and

requesting control of said data and control bus prior to said assertion of said system action.

21. A method as claimed in Claim 20 wherein:

said Boundary-Scan master generates a test mode select (TMS) signal which controls Boundary-Scan testing of an integrated circuit (IC) having an instruction register and a test access port (TAP) controller for operating in a plurality of states, including an Exit1-DR state; and

said determining step comprises a step of identifying when said EXTEST instruction is loaded in said instruction register of said IC and said TAP controller has entered said EXIT1-DR state.

The examiner relies on the following references:

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Gamache et al. (Gamache)	5,202,991	Apr. 13, 1993
Burchard	5,222,068	June 22, 1993

Claims 20-31 stand rejected under 35 U.S.C. § 103. As evidence of obviousness the examiner offers Burchard in view of Gamache.

Rather than repeat the arguments of appellant or the examiner, we make reference to the brief and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejection advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellant's arguments set forth in the brief along with the examiner's rationale in support of the rejection and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the collective evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 20 and 26. We reach the opposite conclusion with

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respect to the invention as set forth in claims 21-25 and 27-31. Accordingly, we affirm-in-part.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of

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obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

With respect to independent claim 20, the examiner has considered the teachings of Burchard and Gamache and has explained why it would have been obvious to combine the teachings of these two references to arrive at the claimed invention [answer, page 3]. Considering the breadth of claim 20, we are of the view that the examiner has at least satisfied the burden of presenting a prima facie case of obviousness. Therefore, we consider appellant's arguments and the relative persuasiveness of all the evidence.

Appellant's first argument is that neither reference teaches the claimed first step of determining when an external test (EXTEST) instruction will assert a system action [brief, page 6]. Burchard teaches a Boundary-Scan architecture which is

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consistent with the standard set forth by the Joint Test Action Group (JTAG)[column 1]. This standard includes several instructions such as EXTEST, INTEST and RUNBIST as noted by Burchard [column 10, lines 11-12]. Thus, Burchard clearly suggests to the artisan that a conventional Boundary-Scan architecture is designed to receive the external test (EXTEST) instruction. Appellant's own disclosure states "[t]hese system action instructions are known and include EXTEST, INTEST, RUNBIST, CLAMP, and HIGHZ instructions" [page 10]. Therefore, the EXTEST instruction which will assert a system action is clearly present in Burchard, and the Burchard device obviously determines the presence of this signal.

Appellant argues that neither reference teaches the step of "requesting control of said data and control bus prior to said assertion of said system action in the context of a boundary-scan master" [brief, pages 6-7]. We fail to see the relevance of the Boundary-Scan master in the invention of claim 20. The preamble of claim 20 recites that the Boundary-Scan master is connected to a data and control bus. The body of claim 20 recites an interaction with the data and control bus, but not specifically with the Boundary-Scan master. Thus, we do not view the

invention as recited in claim 20 as requiring anything to be done by a Boundary-Scan master.

On the other hand, claim 20 merely recites that control of a data and control bus is requested before a system action is asserted. The examiner has apparently construed this language to mean that the data and control bus is requested by the EXTEST instruction before the EXTEST instruction is given access to this bus. We agree with this claim construction. We also agree that this operation is suggested by Burchard.

Burchard notes that in a circuit that meets the JTAG standard discussed above, the "sequence of individual operations is monitored and controlled by a bus master" [column 1, lines 16-21]. In such a device the bus master controls access to a bus by a plurality of devices each of which may have access to the bus. Thus, no device in Burchard gets access to the bus in question until it has been granted access by the bus master. Thus, when the EXTEST instruction in Burchard indicates that the bus is needed for a system action, the bus master must request that control be given to the EXTEST instruction before it can execute the system action. This operation is consistent with the language of claim 20.

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Appellant argues that Burchard would not logically lead one to the limitations of claim 20 because Burchard "is directed to self-testing of a boundary scan integrated circuit in a PRODUCTION environment ... and NOT in a operational environment" [brief, page 8]. First, we find no language in claim 20 which restricts operation to an operational environment as opposed to a production environment. Second, Burchard notes that his device is operable for normal condition, production test and self-test [column 8, lines 32-33]. This passage would have suggested to the artisan that Burchard was designed to be used in an operational environment.

In summary, since we have determined that the examiner has presented a prima facie case of the obviousness of the invention as broadly recited in claim 20, and since a preponderance of all the evidence and arguments supports the examiner's position, we sustain the examiner's rejection of claim 20.

We now consider dependent claims 21-25. Each of these claims recites a specific relationship between an operation performed by the Boundary-Scan master while it is in certain specific states. Each of the states per se is admitted by appellant to be well known in the art [specification, page 8].

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Nevertheless, the invention is disclosed to be in the operations performed by the Boundary-Scan master while it resides in various ones of these states. Claims 21-25 specifically recite these conditions.

While we cannot address the question of whether prior art Boundary-Scan masters have been known to operate in the claimed manner, we can address the fact that neither Burchard nor Gamache teaches or suggests what operations take place while the Burchard Boundary-Scan master is in any of the conventional states. Burchard does not mention any of the conventional states of a Boundary-Scan master within the JTAG standard. Even if these states are known to exist in the Burchard Boundary-Scan master, there is absolutely no evidence that the operations recited in claims 21-25 are performed during the states as claimed. The examiner at most has found that the operations as claimed must be performed by the Burchard device, but the examiner has otherwise ignored the claimed relationships of the operations to the states. Therefore, with respect to claims 21-25, the examiner has failed to establish a prima facie case of obviousness. Accordingly, we do not sustain the rejection of these claims as proposed by the examiner.

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With respect to independent claim 26, the examiner has basically supported the rejection of this claim in the same manner as discussed above with respect to independent claim 20 [answer, page 3]. Considering the breadth of claim 26, we are of the view that the examiner has at least satisfied the burden of presenting a prima facie case of obviousness. Therefore, we again consider appellant's arguments and the relative persuasiveness of all the evidence.

Appellant argues that neither Burchard nor Gamache teaches "a Boundary-Scan master comprising an arbitration interface and control means, coupled to said arbitration interface, for determining when to request control of said data and control bus" [brief, page 18]. As we noted above, Burchard clearly teaches that a conventional Boundary-Scan device includes a bus master. A bus master is an arbitration interface for arbitrating access to the bus in question. As we noted in our discussion of claim 20 above, the bus master of Burchard includes control means which determines when to request access to the bus. This operation broadly meets the language of claim 26.

Appellant argues that there is no motivation to combine the teachings of Burchard with those of Gamache. Although we agree with the examiner that it would have been obvious to

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combine teachings of Burchard with those of Gamache to arrive at the features broadly recited in claim 26, we also find that Burchard alone teaches elements of claim 26 which the examiner relies on Gamache to provide. For example, the examiner relies on Gamache to teach bus mastering [answer, page 7] although Burchard clearly suggests a bus master as discussed above. When claim 26 is properly interpreted to require nothing more than the detection of a signal such as EXTEST and a bus access request in response thereto, we agree with the examiner that this invention would have been obvious in view of the applied prior art.

We now consider dependent claims 27-31. Each of these claims recites a specific relationship between an operation performed by the Boundary-Scan master while it is in certain specific states similar to the recitations of dependent claims 21-25. For reasons we have pointed out above, the examiner's rejection does not properly address these claim limitations and they cannot be found in the applied prior art. Therefore, we again conclude that the examiner has failed to establish a prima facie case of obviousness for the invention as recited in claims 27-31. Accordingly, we do not sustain the rejection of these claims as proposed by the examiner.

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In summary, we have sustained the examiner's rejection with respect to claims 20 and 26, but we have not sustained the rejection with respect to claims 21-25 and 27-31. Therefore, the decision of the examiner rejecting claims 20-31 is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

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JAMES D. THOMAS	)	
Administrative Patent Judge	)	
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	)	
	)	BOARD OF PATENT
ERROL A. KRASS	)	
Administrative Patent Judge	)	APPEALS AND
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	)	INTERFERENCES
	)	
JERRY SMITH	)	
Administrative Patent Judge	)	

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Vincent B. Ingrassia  
Motorola, Inc.  
Intellectual Property Dept.  
Suite R3108, P. O. Box 10219  
Scottsdale, AZ 85271-0219