

Patent sweep

US7373531B2 — claim 2
Examiner Search · Patent invalidity and prior-art search
2026-10-24

1 The matter

US7373531B2 — Signal detection method, frequency detection method, power consumption control method, signal detecting device, frequency detecting device, power consumption control device and electronic apparatus
Assignee: Near Field Electronics LLC · Filed 2005-05-05 · Priority (record) 2005-01-11
Target claim 2 (4 elements as split below)
Prior-art cutoff: 2005-01-11 — priority date, confirmed by the requester on the order form. Every query below is capped to it.
Run US7373531B2-2026-10-21T21-46-51-665Z

2 Bottom line

3 of 4 elements of claim 2 are explicitly disclosed by the 5 prior-art references read in full, led by US6781416B1. Not found in those references: E4.

Claim 2. 3 of 4 elements are matched to a passage in US6781416B1. No single document read contains passages for every element.

- US6781416B1** (2004-08-24): E1, E2, E3

Weakest element: E4: not shown in terms by the documents read. **Dates:** US6781416B1 is dated less than a year before the cutoff and can be antedated by earlier invention evidence. These are statements of what the documents show; this report expresses no opinion on anticipation or obviousness.

2b The record

Facts from the file wrapper, the Office's citations and our litigation watch for this patent, read for this run.

Why it was allowed	The notice of allowance states no reasons for allowance. The claims were amended in the last response before allowance. The applicant argued over the cited art before allowance. (4 actions and responses on the record.)
Where the examiner looked	6 search session(s), 47 query lines in US-PGPUB, USPAT, USOCR; classes 713/300, 713/340. The search notes filed on 2008-01-02 differ from those filed on 2007-08-08 — a further search was run between them. Full log: §12a.

What the Office already had	6 reference(s) cited by the examiner and 6 by the applicant; 60 documents with their foreign families. None is reported as a find here. List: §12b.
Litigation and PTAB	27 suit(s) on this patent in our litigation watch, against 27 defendant(s); no PTAB proceedings. Counts only. The watch reads complaints as they are filed, so a suit from before it started may not appear.

What this page leaves out: the applicant's arguments and amendments, art raised in other suits and at PTAB, the cases, counsel, motions and rulings, and the plaintiff's own reading of its claims. Those are the **Case Brief** (\$199, 2 business days). A paid sweep's fee is credited in full against a Case Brief or a signed search on the same patent within 60 days of payment; the date is in your delivery email.

3 What the claim requires

The method monitors a circuit's 'through current flowing through a circuit' — the brief shoot-through current that occurs in complementary logic gates each time the input transitions — as a proxy for signal activity. When that current is sensed, the method concludes the signal is 'in a first state in which the signal repeatedly goes to a high level and a low level alternately,' meaning it is toggling (e.g., a clock or data stream). Conversely, if 'the through current is not detected in a predetermined period of time,' the method concludes the signal is 'kept at one of a high level and a low level,' meaning it is stuck or idle, without ever directly sampling the voltage level.

Where the novelty most likely sits: **E4** — E4 introduces the specific condition of inferring a static (stuck-high or stuck-low) signal state from the *absence* of through current over 'a predetermined period of time,' which is the distinctive temporal threshold that separates this detection scheme from simply sensing current presence.. Every quoted phrase above was checked against the claim text by code.

Claim 2, element by element:

#	Element
E1	A signal detection method comprising the steps of:
E2	detecting a through current flowing through a circuit to which a signal is inputted from an input terminal;
E3	determining that the signal is in a first state in which the signal repeatedly goes to a high level and a low level alternately when the through current is detected; and
E4	determining that the signal is in a second state in which the signal is kept at one of a high level and a low level when the through current is not detected in a predetermined period of time.

4 References read in full

Reference	Title	First published	Role	Prior-art status
US6781416B1	Push-pull output driver	2004-08-24	load-bearing	prior art — inventors differ from the target — third-party art.
US6122698A	Data bus having conducting lines driven at multiple adjustable current levels to transfer multiple-bit data on each conducting line	1999-10-21	nearly complete alone	prior art — inventors differ from the target — third-party art.

Reference	Title	First published	Role	Prior-art status
US7406617B1	Universal multi-path driver for storage systems including an external boot device with failover and fallback capabilities	2008-07-29	supporting	prior art — inventors differ from the target — third-party art.
US20050078868	Method and apparatus for summarizing and indexing the contents of an audio-visual presentation	2005-03-30	supporting	prior art — inventors differ from the target — third-party art.
US7227391B2	Semiconductor integrated circuit device and semiconductor integrated circuit system	2005-11-03	supporting	prior art via its own priority claim — check — inventors differ from the target — third-party art.

Candidate pool: 107 pre-cutoff documents matched at least one element query (exclusion set applied; 409 post-cutoff matches discarded). Top by element coverage: US4550397A [E3] · US6421221B1 [E3] · US5339399A [E3] · US6212609B1 [E3] · US6473843B2 [E3] · US5210531A [E3] · US6665801B1 [E3] · US5752047A [E3]

5 Coverage matrix

Element	US6781416B1	US6122698A	US7406617B1	US20050078868	US7227391B2	Coverage
E1 A signal detection method comprising the steps of:	explicit	explicit	—	—	inherent	explicit
E2 detecting a through current flowing through a circuit to which a signal is inputted from an input terminal;	explicit	explicit	—	—	explicit	explicit
E3 determining that the signal is in a first state in which the signal repeatedly goes to a high level and a low level alternately when the through current is detected; and	explicit	<i>near-miss</i>	—	—	<i>near-miss</i>	explicit

Element	US6781416B1	US6122698A	US7406617B1	US20050078868	US7227391B2	Coverage
E4 determining that the signal is in a second state in which the signal is kept at one of a high level and a low level when the through current is not detected in a predetermined period of time.	<i>near-miss</i>	<i>near-miss</i>	—	—	<i>near-miss</i>	none

explicit = disclosed in terms at the cited location · inherent = only by necessary implication (shown, not counted as coverage) · near-miss = a passage on the point whose direction, cardinality or a sub-requirement does not match · — = nothing located. Only same-direction explicit disclosures close an element.

6 Claim chart — not included at this tier

Withheld at this tier: the element-by-element claim chart with verbatim quotations and the signed statement (§11). Both are supplied by the examiner-assisted search and by the focused and full searches, to which this run's fee is credited in full within 60 days — the four tiers side by side: <https://examinersearch.com/order>.

What a signed Focused search delivers: every independent claim charted with each limitation printed in full and split into its components; every component shown by a verbatim quotation with its exhibit page and a plain-language note saying what it shows; a primary combination of at most four references for each claim, with a factual statement of what each shows and the weakest element; coverage computed component by component; stamped exhibits of every document relied on; an online version with each claim component colour-coded through the quotations; signed by the searcher.

7 The residual

Not explicitly disclosed by the references read: **E4**.

Closest references read in full, and what each lacks

Reference	Discloses	Why it does not carry the claim alone	What would complete it
US6781416B1 Push-pull output driver	E1, E2, E3	no disclosure located for E4 in the description read	a second reference teaching E4 in the same architecture (signal detection method) would complete the combination
US6122698A Data bus having conducting lines driven at multiple adjustable current levels to transfer multiple-bit data on each conducting line	E1, E2	no disclosure located for E3, E4 in the description read	a second reference teaching E3, E4 in the same architecture (signal detection method) would complete the combination

Reference	Discloses	Why it does not carry the claim alone	What would complete it
US7406617B1 Universal multi-path driver for storage systems including an external boot device with failover and fallback capabilities	—	no disclosure located for E1, E2, E3, E4 in the description read	does not bear on this claim; listed because it ranked in the candidate pool
US20050078868 Method and apparatus for summarizing and indexing the contents of an audio-visual presentation	—	no disclosure located for E1, E2, E3, E4 in the description read	does not bear on this claim; listed because it ranked in the candidate pool
US7227391B2 Semiconductor integrated circuit device and semiconductor integrated circuit system	E2	no disclosure located for E3, E4 in the description read; E1 only by implication	a second reference teaching E3, E4 in the same architecture (signal detection method) would complete the combination

What a deeper search would read next

This is a **preliminary search**: it read the 5 documents above in full and stopped there — that is the whole of this tier, not an unfinished job. 120 further pre-cutoff documents matched the element queries (44 on two or more elements) and are ranked below, from the search and not from a reading.

What the next search up the ladder adds is not a reformatting of the pages above. It is three things this tier does not contain:

- **A searcher reads the references against the claim.** The coverage above (§5) is a model's reading of the description text, and §10 says so. A read can overturn them in either direction — a near-miss that is in fact explicit is the finding that decides a case, and only a person reading the original document can call it.
- **The gaps are searched by hand.** §7 names what is missing and what would complete it, and then stops. The next tier *goes and looks* — the residual worked as a search of its own, by someone who knows where the art hides when the automated searches come back thin. That is where a case is usually won or genuinely closed.
- **It is charted and signed.** Every element against the best reference, verbatim pinpoint citations, in the form contentions and a petition require — with a signed statement of what was searched and what was *not* found. The signature is the part a filing can rest on; nothing automated can produce it.

The tiers: the **examiner-assisted search** (\$499 (standard \$999), this claim), the **focused search** (\$899 (standard \$2,500), every independent claim, plus non-patent and foreign literature with translations of the passages relied on) or the **full search** (\$1,500 (standard \$5,000), all asserted claims including dependents, alternative grounds charted, and exclusion screening against the prosecution record). This run's fee is credited in full against any of them on the same patent within 60 days. Launch prices, valid through December 31, 2026. Side by side: <https://examinersearch.com/order>.

Reference	Elements matched in search (not yet read)	Date
US4550397A Alternate paths in a self-routing packet switching network	E3	1985-10-29

Reference	Elements matched in search (not yet read)	Date
US6421221B1 Apparatus and method for redirecting electrostatic discharge currents via an alternate path to a reference voltage node	E3	2002-07-16
US5339399A Cache controller that alternately selects for presentation to a tag RAM a current address latch and a next address latch which hold addresses captured on an input bus	E3	1994-08-16
US6212609B1 Alternate access mechanism for saving and restoring state of read-only register	E3	2001-04-03
US7065665B2 Interlocked synchronous pipeline clock gating · found in the patent's own classification	E2, E3	2006-06-20
US7038520B2 Timing signal generating circuit and receiver circuit designed to speed up signal transmission · found in the patent's own classification	E1, E2	2006-05-02
US7006897B2 Apparatus, method and computer program product for monitoring AC line current through the step start resistors of a high voltage power supply · found in the patent's own classification	E1, E2	2006-02-28
US6737892B2 Method and apparatus for detecting valid clock signals at a clock receiver circuit · found in the patent's own classification	E1, E2	2004-05-18

8 What was not found, and how hard we looked

Source	Status
US patents and published applications (full text)	searched
Citations of the closest references	searched
Full reading of the closest references	searched

searched = searched and returned candidates · searched, nothing before the cutoff = searched, no document dated before the cutoff.

Classifications searched, and how large each is

CPC group	Documents	Note
G06F1	141,906	documents dated on or before 2005-01-11
Y02D10	6,136	documents dated on or before 2005-01-11

The patent's own CPC main groups, each searched.

Where the effort went

Element	Queries	Largest set	Smallest non-zero	Zeros	Engines
E1	17	4,931,098	310	0	USPTO Patent Public Search
E2	1	820	820	0	USPTO Patent Public Search
E3	1	1,459	1,459	0	USPTO Patent Public Search
E4	57	3,149,333	1	8	USPTO Patent Public Search
other	13	2,790,645	3	1	Google Patents, USPTO Patent Public Search
several elements together	158	2,957,473	1	17	USPTO Patent Public Search

26 queries returned zero; every zero result was checked before it was relied on.

For the elements not found:

- **E4:** 57 queries, largest set 3,149,333, 8 zeros; searched again on this element alone.

9 Search record

251 queries were recorded in this run, by source below. The examiner's own search, for comparison, is in §12. Hit counts are each source's own totals before the date cap and the exclusion of art already of record. The full query log is kept and is available with a signed search.

Source	Queries	Hits
USPTO Patent Public Search	249	65,441,719
Google Patents	1	5,371

10 Limitations

- Automated and unsigned. This is not an opinion of validity or invalidity and creates no attorney–client relationship.
- The cutoff is the date confirmed on the order form. If the patent is entitled to a different date, every date-capped result above shifts with it.
- Element membership from a search engine is approximate; only the references in §4 were read in full, and only their §5 cells are verified readings.
- Inherent and near-miss cells are shown so the reader can see what was located; neither closes an element.
- Google Patents similarity is opportunistic and was available during this run.

11 Review

READ BEFORE RELEASE BY Michael W. Smith, Examiner Search	RELEASED October 21, 2026 at 6:30 PM CT	ATTESTED Reviewed and released
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This is an attestation that the report was read before it went out, not a signature. The read checks the coverage of each element and every reference cited against the documents. A **signed statement** of what was searched and what was not found is the examiner-assisted search (§6), and is deliberately not produced by an automated tier.

Where each element appears in each reference, with the passages quoted verbatim, is the claim chart: it is supplied by the examiner-assisted search and the focused and full searches (§6).

12 The examiner's record

The material the free tools on examinersearch.com give for this patent, read for this run: where the Office looked, what it already had, and the words the inventors used.

12a • The examiner's search

Read from the search notes in the file wrapper — examiner Michael Wang, art unit 2115. Classes searched: 713/300, 713/340.

Databases: US-PGPUB, USPAT, USOCR.

- The examination rests on 47 queries across 3 databases (US-PGPUB, USPAT, USOCR).
- The search notes filed on 2008-01-02 differ from those filed on 2007-08-08 — a further search was run between them.

Session	Line	Query as the examiner ran it	Hits
2008-01-02	L1	"713/300".CCLS.	3,232
2008-01-02	L2	"713/340".CCLS.	861
2008-01-02	L3	"713/340".CCLS. and ((signal or current) near2 detect\$3)	274
2008-01-02	L4	"713/340".CCLS. and ((signal or current) near2 detect\$3)	274
2008-01-02	L5	"713/300".CCLS. and ((signal or current) near2 detect\$3)	731
2008-01-02	L6	"713/300".CCLS. and ((signal or current) near2 detect\$3) with (transistor)	28
2008-01-02	L7	"713/340".CCLS. and ((signal or current) near2 detect\$3) with (transistor)	10
2007-08-08	S13	"signal detection method"	941
2007-08-06	S14	((KATSUYA) near2 (SHIMIZU)). INV.	18
2007-08-06	S15	((HIROKO) near2 (KINOSHITA)). INV.	2
2007-08-07	S16	(signal near2 detect\$3 near2 (method or device or circuit or apparatus))	62,062
2007-08-07	S17	(signal near (detect\$3) near circuit).ti.	172
2007-08-07	S18	"713".CLAS.	32,258
2007-08-07	S19	(detect\$3 near2 (clock or clk or signal)) near4 (by or (base\$2 near2 (on or upon)) near4 (current or voltage))	114
2007-08-07	S20	S19 and transistor	49
2007-08-07	S21	(detect\$3 near2 ((clock or clk or signal) near2 (state or transition))) near4 (by or (base\$2 near2 (on or upon)) near4 (current or voltage))	1

Session	Line	Query as the examiner ran it	Hits
2007-08-07	S22	(detect\$3 near2 (clock or clk or signal)) near4 (by or (base\$2 near2 (on or upon)) near4 (current))	56
2007-08-07	S23	(determin\$3 near2 (clock or clk or signal)) near4 (by or (base\$2 near2 (on or upon)) near4 (current))	46
2007-08-07	S24	S23 and transistor	17
2007-08-07	S25	(current near2 detect\$3) with ((clock or clk or signal) near2 (transition or state or position or edge))	1,313
2007-08-07	S26	(current near2 detect\$3) with ((determin\$3 or calculat\$3) near3 (clock or clk or signal) near2 (transition or state or position or edge))	82
2007-08-07	S27	S26 and transistor	44
2007-08-07	S28	S26 same transistor	7
2007-08-07	S29	S27 not S28	37
2007-08-07	S30	(current near2 detect\$3) with (signal or clock or clk) and transistor	12,077
2007-08-07	S31	(current near2 detect\$3) with ((signal or clock or clk) near4 (state)) and transistor	565
2007-08-07	S32	(current near2 detect\$3) near4 ((signal or clock or clk) near4 (state)) and transistor	247
2007-08-07	S33	(current near2 detect\$3) near4 (determin\$3 (signal or clock or clk) near4 (state)) and transistor	52
2007-08-07	S34	("high to low" or "rising to falling" or "falling to rising" or "low to high" or transition\$3) near5 (current near2 flow\$3) near2 (only or by or base\$2)	90
2007-08-07	S35	S34 and transistor	83
2007-08-07	S36	(only or when or as) near5 (clock or signal or clk) near2 (rising or falling or high or low)	49,253
2007-08-07	S37	(only or when or as or during) near5 (clock or signal or clk) near2 (rising or falling or high or low) near5 (current near2 flow\$3)	261
2007-08-07	S38	(only or when or as or during) near5 (clock or signal or clk) near2 (rising or falling or high or low) near5 (current near2 flow\$3) and transistor	207
2007-08-07	S39	(only or when or as or during) near5 (clock or signal or clk) near2 (rising or falling or high or low) near5 (current near2 flow\$3 near2 detect\$3) and transistor	4
2007-08-07	S40	(only or when or as or during) near5 (current near flow\$3) near5 ((ris\$3 near2 fall\$3) or (high near2 low) or (positive near2 negative))	320
2007-08-07	S41	(only or when or as or during) near5 (current near flow\$3) near5 ((ris\$3 near2 fall\$3) or (high near2 low) or (positive near2 negative)) and transistor	237
2007-08-07	S42	((current near flow\$3) near5 ((ris\$3 near2 fall\$3) or (high near2 low)) and transistor) not S41	843
2007-08-07	S43	S42 and (current near2 mirror)	148
2007-08-08	S44	"power consumption signal"	765
2007-08-08	S45	"power consumption signal" same (detect\$3)	123
2007-08-08	S46	"power consumption signal" same (detect\$3) and transistor	75

Session	Line	Query as the examiner ran it	Hits
2007-08-08	S47	"power consumption signal" same (detect\$3) and transistor and ((ris\$3 near2 fall\$3) or (high near2 low))	54
2007-08-08	S48	"through current"	38,520
2007-08-08	S49	"through current" and power and transistor	19,519
2007-08-08	S50	"through current" and (power near2 (consum\$3 or consumption or sav\$3)) and transistor	6,718
2007-08-08	S51	((detect\$3 or determin\$3) near2 "through current") and (power near2 (consum\$3 or consumption or sav\$3)) and transistor	221
2007-08-08	S52	((detect\$3) near2 "through current") same (power near2 (consum\$3 or consumption or sav\$3)) and transistor	16

12b • References of record

6 cited by the examiner, 6 by the applicant; with their foreign family members, 60 documents were already before the Office. None of them is reported as a find in §4 — the search excluded all of them by construction.

Reference	Of record as	Date	Title
JP2000224015A	Cited by the applicant	2000-08-11	Clock stop detection circuit and semiconductor integrated circuit device having the same
JPS62106815A	Cited by the applicant	1987-05-18	Fire retardant air filter
US20020145477A1	Cited by the applicant	2002-10-10	Power-conserving external clock for use
US20030051177A1	Cited by the applicant	2003-03-13	Method and apparatus for system power control through sensing peripheral power consumption
US20040168095A1	Cited by the applicant	2004-08-26	Mobile computer with desktop type processor
US20040257122A1	Cited by the examiner	2004-12-23	Clock signal detection circuit and semiconductor integrated circuit using the same
US20040257159A1	Cited by the examiner	2004-12-23	Apparatus for a differential self-biasing CMOS amplifier
US5218247A	Cited by the examiner	1993-06-08	CMIS circuit and its driver
US5225717A	Cited by the examiner	1993-07-06	BiCMOS input buffer circuit operable at high speed under less power consumption
US5296757A	Cited by the examiner	1994-03-22	Low-noise output driver having separate supply lines and sequenced operation for transient and steady-state portions
US6008686A	Cited by the examiner	1999-12-28	Power consumption control circuit for CMOS circuit
US6765433B1	Cited by the applicant	2004-07-20	Low power implementation for input signals of integrated circuits

Foreign family members of those references (41) — they do not appear on the patent's face, and a reference the Office already had through its US member is not new art: AU2001232952A1, AU2001234551A1, AU2001234552A1, AU2001234609A1, CA2398730A1, CN1788243A, DE19828176A1, DE19828176C2, EP1262015A1, EP1262015A4, EP1295397A1, EP1606680A2, EP1606680A4, JP2004318748A, JP2567172B2, JP3367441B2, JPH04130770A, JPH04335297A, JPH05191257A, JPH0554363B2, KR100297055B1, KR19990007190A, TW200416522A, TW200428175A, US20060136759A1, US6501342B2, US6981161B2, US7002377B2,

US7203856B2, US7227411B2, US7574614B2, WO2001056008A1, WO2001056008A9, WO2001056062A2, WO2001056062A3, WO2001056062B1, WO2001056145A1, WO2001056145A9, WO2001056163A1, WO2004086456A2, WO2004086456A3.

The patent's own family (7): EP1679575A2, EP1679575A3, JP2006197038A, JP4178279B2, TW200625814A, TWI311008B, US20060156044A1.

12c • The patent's own words

Words the specification uses that the independent claims do not, most frequent first — the inventors' vocabulary rather than the attorney's, and the vocabulary the art is usually written in. The patent sweep searches with this list.

connected (40), clock (28), voltage (19), characterized (16), resistor (15), save (14), capacitor (14), presence (14), absence (14), moreover (13), potential (13), section (13), series (12), switched (12), generated (11), pre-scaler (10), oscillator (9), simple (9), off (9), switches (8), vout (8), vin (6), inv (6), provide (6), capable (6), inverted (5), applying (5), applied (5), intermediate (5), application (4), claims (4), bias (4), stop (4), cmos (4), vdd (4), source (4), drain (4), patent (3), like (3), ground (3)

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