

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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**SILICON LABORATORIES, INC.**  
Petitioner

v.

**CRESTA TECHNOLOGY CORPORATION**  
Patent Owner

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**CASE: IPR2015-00626**  
Patent No. 7,265,792

Title: Television Receiver for Digital and Analog Television Signals

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**PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE**

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**ABBREVIATIONS**

'585 Patent	U.S. Patent No. 7,075,585, Ex. 2022
'792 Patent	U.S. Patent No. 7,265,792, Ex. 1001
BRI	Broadest Reasonable Interpretation
FWD	Final Written Decision, IPR2015-00809, Paper No. 56 (PTAB Oct. 21, 2015), Ex. 1062
Holberg Rep.	Reply Declaration of Douglas Holberg, Ph.D., in Support of Petitioner's Reply, Ex. 1061 (Jan. 29, 2016)
Holberg Supp.	Supplemental Declaration of Douglas Holberg, Ph.D., in Support of Petitioner's Reply, Ex. 1063 (Feb. 12, 2016)
Opris Dec.	Declaration of Ion E. Opris Ph.D. Regarding The Validity Of US Patent No. 7,265,792, Ex. 2032 (Nov. 30, 2015)
POR	PATENT OWNER'S RESPONSE, IPR2015-00626, Paper No. 17 (Nov. 30, 2015)

**TABLE OF AUTHORITIES**

<b>Cases</b>	<b>Page(s)</b>
<i>Omega Engineering, Inc. v. Raytek Corp.</i> , 334 F.3d 1314 (Fed. Cir. 2003) .....	1, 9

## I. INTRODUCTION

The broad independent claims of the '792 Patent to a multi-format television receiver have been found unpatentable over the combination of Thomson and Harris. FWD at 40. What remains are dependent claims covering notoriously well known aspects of television receivers including: multiple transmission sources of the television signal (29); multiple digital filter coefficients in memory (24); parallel processing of real and imaginary components (25); format selection (26) by detecting carrier signals (28) or in response to a user input (27); differential signaling and multiplexing (18); and low pass filtering (19). Patent Owner's arguments for patentability are based in large part on mischaracterizations about what the prior art teaches or what the patent claims. These claims are obvious.

## II. CLAIM CONSTRUCTION

The Board should reject both of Patent Owner's proposed claim constructions because they are not supported by the intrinsic or extrinsic evidence. In addition, the Board should give the disputed terms the same meanings in both the '585 Patent and the '792 Patent given their common lineage. *See Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1334 (Fed. Cir. 2003).

### A. "Select Signal"

Patent Owner suggests that this phrase means "a signal that performs a selection and that comprises information about the format of said input RF signal."

POR at 7. The Board should reject this construction because it improperly tries to read into the claim the vague notion of “information” in order to distinguish Zenith’s “control” signal. Holberg Rep., ¶¶14–32. The Board should construe this term to mean “a select signal that serves as a sign or indication of or is suggestive of a format of said input RF signal.” Holberg Supp., ¶8.

**B. “Carrier Signals”**

Claim 28 recites generating the select signal “by detecting carrier signals.” The term “carrier signals” should be given its plain and ordinary meaning, as reflected in the IEEE dictionary. Holberg Supp., ¶9. That reference defines “carrier signals” as “[a] wave having at least one characteristic that may be varied from a known reference value by modulation.” Holberg Rep., ¶33 (quoting Ex. 2032). This construction is supported by the specification, which identifies two carrier signals—“visual carrier signal” and “pilot carrier”—each of which is a wave that may be varied about a known reference value by modulation. Ex. 1001 at 6:15–17. Thus, both the intrinsic and extrinsic evidence support Petitioner’s reading of this term, while Patent Owner’s position is directly at odds with it. Holberg Rep., ¶¶42–44.

**III. THE CHALLENGED CLAIMS ARE UNPATENTABLE**

**A. Ground 1: Receiving RF Signals from Multiple Sources is Obvious**

Patent Owner argues that the now unpatentable television receiver of claim 1 is rendered non-obvious by specifying the source of the television signal. In particular, Patent Owner argues that while Thomson admittedly discloses a multi-format TV receiver capable of processing an RF signal transmitted by a satellite, it would not be obvious for Thomson to also process an RF signal transmitted by antenna or over cable. Patent Owner's argument is premised on a mischaracterization of claim 29 and ignores its own specification.

### **1. Patent Owner Mischaracterizes Claim 29**

The underlying premise of Patent Owner's argument appears to be that the receiver of claim 29 must be capable of processing a television signal broadcast using industry standard frequency bands and protocols. Because Thomson's receiver is tuned to the satellite range, so goes the argument, Thomson's receiver cannot process a TV signal broadcast using the industry standard terrestrial or cable bands, which use different bands and protocols. Claim 29, however, does not require industry standard compatibility. Instead, claim 29 only requires the source to be different, not the frequency band or encoding schemes.

All that claim 29 requires is that the receiver be able to process "the input signal" of claim 1 where that signal includes "an RF signal" that originates from three different sources—satellite, cable, and terrestrial. Patent Owner admits that

Thomson's receiver is capable of receiving "an RF signal" from a satellite source. As Dr. Holberg explains, Thomson is also capable of receiving that same signal ("IF<sub>SAT</sub>") if it had been transmitted via cable or over an antenna. Holberg Supp., ¶13. Thomson's receiver does not care whether the input RF signal was originally transmitted via satellite, cable or terrestrial. All that it cares about is that the input signal be within a given frequency range and that the television signal be in either an analog or digital format. As long as those two conditions are satisfied, Thomson's receiver will process the input signal, regardless of source. *Id.*

## **2. Patent Owner's Position is Belied by the '792 Patent**

The applicants admitted in the '792 Patent specification that a TV receiver, almost by definition, receives and processes TV signals from all three sources:

*"A television (TV) or video recorder includes a television signal receiver (or television receiver) to receive terrestrial broadcast, cable television or satellite broadcast television signals and to process the televisions signals into the appropriate video signals for display and for recording."*

Ex. 1001 at 1:14–18 (emphasis added). Patent Owner's expert agreed that it was standard for TV's to accept input signals from all three sources. Ex. 1060 at 131:9 ("That was known in the art."). This should be the end of the debate.

Patent Owner's argument is also rather disingenuous in light of the complete absence of any disclosure relating specifically to an embodiment that has "the



capability of processing” an RF signal received from all three sources. POR at 14. The word “satellite” only appears twice in the ’792 Patent—once in the specification and once in claim 29. The sole reference in the specification to “satellite” is the passage quoted above describing the state of the art. Ex. 1001 at 1:14–18. The words “cable” and “terrestrial,” on the other hand, appear twice in the specification—once in connection with the admitted prior art (above) and again in connection with “the present invention.” The latter passage summarily states that “[t]he input RF signals can be received from terrestrial broadcast or cable transmissions.” *Id.* at 4:53–55. Notably absent from this list of RF sources is “satellite.” This omission confirms that there are no patentable distinctions between processing satellite and any other source. Holberg Supp., ¶¶16–17.

The applicants also do not describe any specific differences between the embodiment(s) that process RF signals from the various sources. Ex. 1060 at 129:7–29. The reason is that there are no differences, beyond those obvious implementation details that are well known to a POSITA. *Id.* To now argue that the differences between processing an RF signal from a cable or terrestrial source is somehow non-obvious is disingenuous and inconsistent with the ’792 Patent disclosure. Patent Owner cannot have it both ways—either the differences are significant, in which case it should have explained those differences, or they are

not, in which case they are obvious. Patent Owner's expert admitted during his deposition that the latter is true. Ex. 1060 at 129:7–15 (“I think that was known in the art at that time of the invention”). Claim 29 is obvious.

**B. Ground 2: Claims 24 and 25 are Obvious**

Now unpatentable claim 1 covers a signal processor that selects one of two different sets of filter coefficients, with each set corresponding to a different television format (e.g., digital and analog). Claim 24 adds the obvious step of storing those filter coefficients “in memory” so that the signal processor can access them logically by “indexing” into that memory. Holberg Rep., ¶47. Claim 25 recites parallel computing units for processing the real and imaginary parts of the signal. Grumman in combination with Thomson and Harris renders these obvious.

**1. Grumman Teaches Two Dynamically Swapped Filter Functions**

Claim 24 of the '792 patent is a mirror image of claim 11 of the '585 Patent. Not surprisingly, Patent Owner repeats the same arguments here as it did in IPR2015-00615. As a result, Petitioner's replies apply with equal force here:

- Thomson describes a single adaptive digital filter, not two parallel filters. Holberg Rep., ¶¶51–52.
- Harris teaches a single reprogrammable FIR filter—rather than multiple, dedicated filters—with different sets of FIR filter coefficients stored in

memory to save “cost and board space.” Holberg Rep., ¶¶53–54.

- Grumman discloses a dual-memory architecture for an adaptive FIR filter that includes two sets of filter coefficients that are swapped in and out of the filter transparently. Holberg Rep., ¶¶54–63.
- Grumman describes two parallel processing circuits—one to process the real component and the other to process the imaginary component—that together with the “swap” circuitry comprise a “signal processor.” Holberg Rep., ¶¶65–69.
- A POSITA would be motivated to use Grumman’s dual-memory architecture to implement Thomson’s adaptive filter because of its transparent switching, which would result in minimal disruption to the television viewer. Holberg Rep., ¶71.

Claim 24 is obvious in light of Grumman. Holberg Supp., ¶24.

## **2. Grumman Teaches Parallel Processing of Real and Imaginary**

Claim 25 the ’792 Patent is a mirror image of claim 12 of the ’585 Patent. Once again, Patent Owner repeats the same arguments here as it did in IPR2015-00615. As a result, Petitioner summarizes its response below:

- Grumman clearly describes two computing units—one “processing a real part of said finite impulse response filter operation” and another “processing

an imaginary part.” Holberg Rep., ¶72.

- Patent Owner’s expert agrees. Ex. 1060 at 91:10–13.
- Petitioner articulated a rational basis to combine Grumman with Thomson and Harris. Holberg Rep., ¶¶73–75.
- Patent Owner’s premise that Harris includes “only” real filters is false, as shown by Patent Owner’s own exhibit. Ex. 2011–13 (NCOM “converts the signal of interest to baseband, generating a real component [Q] and an imaginary component [I].”); *see also* Holberg Rep., ¶75.

In summary, a parallel processing of imaginary and real components of a complex signal was well known. The ’792 Patent does nothing more than apply a known technique, in a known way, to achieve a predictable result. Ex. 1001 at 6:1–4 (“DSP 141 includes two computing units to speed up the computation time.”). That is obvious. Holberg Supp., ¶¶30–31. Patent Owner’s argument that it would be unduly complicated is inconsistent with the high level of skill in the art.

**C. Ground 3: Claims 26 and 28 are Obvious**

Claims 26 and 28 of the ’792 Patent correspond to claims 13 and 15, respectively, of the ’585 Patent. The one slight difference between the two sets of claims is that the ’792 Patent refers to a “format/standard selection circuit” while

the '585 claims a “format selection circuit.” Patent Owner does not argue, however, that the claims should be construed differently. Petitioner agrees given that the operative language—“a select signal indicative of a format of the input RF signal”—is the same in both claims. As a result, this term should be construed consistently across the two patents. *Omega Eng'g*, 334 F.3d at 1334.

### **1. Zenith Teaches a Select Signal for Format Selection**

Because Patent Owner repeats the same arguments here as it did in IPR2015-00615, Petitioner summarizes its response to those arguments below:

- Patent Owner’s primary argument is premised on a faulty claim construction of “select signal.” Holberg Rep., ¶¶13–32, 77.
- When properly construed, the Zenith  $\mu$ P output signal provides an “indication of” the format of the television format. Holberg Rep., ¶¶77–78.
- Patent Owner’s attempt to impose an additional “information” requirement on the “select signal” finds no support in the intrinsic or extrinsic evidence.
- The fact that Zenith infers the presence of the digital format in the absence of a valid sync signal, rather than affirmatively detects the digital signal, is irrelevant because the '792 Patent does so also. Ex. 1001 at 6:11–15.
- Patent Owner cannot distinguish Zenith’s selection circuit without also excluding its own preferred embodiment. Holberg Rep., ¶¶37, 85.

Claim 26 is obvious in light of Zenith. Holberg Supp., ¶43.

## 2. Zenith Generates its Select Signal by Detecting Carrier Signals

Claim 28 recites “wherein the format/standard selection circuit generates the select signal by detecting carrier signals identifying one of the formats of the input RF signals.” As described above, this language is essentially the same as in claim 15 of the ’585 Patent and should be construed consistently. As a result, Patent Owner’s arguments fail for the same reasons given in IPR2015-00615:

- Zenith satisfies the broadest reasonable construction of “carrier signals.” Holberg Rep., ¶¶77–86.
- Format detection is implemented in Zenith by “detecting in the baseband signals the presence or absence of [sync signals] which uniquely identify the television standards,” just like the ’792 Patent. Ex. 2022 at 5:12–18; Holberg Rep., ¶85.
- The Balaban patent, cited by the applicant, expressly teaches that “***detecting a carrier signal includes detecting*** at least one of a picture carrier, a sound carrier, and ***a synchronization signal.***” Ex. 1053 at 19:18–20, 15:33–37.

Patent Owner’s attempt to distinguish between the slight differences between the ’585 and ’792 specifications reveals the weakness of its position. POR at 47. The ’585 Patent explicitly states that the standard selection circuit

detects the carrier signals “in the baseband signals.” Ex. 2022 at 5:12–15. Patent Owner argues that, unlike the ’585 Patent, “[t]he ’792 patent never states that the carrier signal may be in the baseband signal.” *Id.* Once again, however, Patent Owner ignores the entirety of the reference.

Other parts of the ’792 specification make clear that this selection circuit detects the carrier signals in the “baseband signals,” just like the ’585 Patent. The ’792 specification explains that in the “auto-detection mode” a “detection circuit can be included in receiver 100 for generating a signal which is fed back to the format/standard selection circuit 133 indicating which television format and standard the input signal is encoded.” Ex. 1001 at 6:17–21. That detection circuit detects in the “first and second output signals the presence or absence of carrier signals.” *Id.* at 6:12–14. These “first and second output signals” are the signals output on the first and second output terminals (104, 105), respectively, of the output circuit (140). *Id.* at 3:57–63. Those “two output terminals selectively provide the *video baseband signals and audio baseband signals*....” *Id.* at 10:17–18 (emphasis added). For example, “the first output signal is a Composite Video Baseband Signal (CVBS) ... and the second output signal is the audio baseband signal....” *Id.* at 7:28–32; 9:5–6; FIG. 1 (“CVBS”). While the descriptions are slightly different, the format/standard selection circuit in the ’792 Patent detects

the carrier signal in the baseband signals, just as in the '585 patent. Patent Owner's argument to the contrary, once again, relies on a mischaracterization of its own patent. Holberg Supp., ¶¶49–50.

**D. Ground 4: Birleson's Selection Circuit is Responsive to User Input**

Patent Owner's first argument is that claim 27 excludes any sort of automatic detection. POR 49–50. The claim language does not specify how the circuit generates the select signal as long as it is “in response to an input signal from a user.” To the extent that Patent Owner is seeking to narrow the claim beyond that, it lacks a textual “hook” in the claim to do it.

The specification also does not draw as sharp a contrast between “manual” and “auto-detection” as implied by Patent Owner. The specification simply describes two exemplary “embodiment[s]” of the detection mode. Ex. 1001 at 6:7–11. The specification is equally clear, however, that this circuit “can be implemented in one of many ways.” *Id.* at 6:6–7. The description concludes by reiterating that, “[i]n other embodiments, other means for selecting between the different formats and standards can be used.” *Id.* at 6:21–23. As Dr. Holberg explains, a POSITA would understand this description to include a combination of user input and auto-detection. Holberg Rep., ¶91. The two are not mutually exclusive. *Id.*



Patent Owner attempts to distinguish Birleson on the ground that Birleson's circuit performs automatic selection as opposed to manual selection which is "explicitly distinguished." POR at 49. First, claim 27 does not exclude some form of auto-detection, as long as it is initiated by a user input. Birleson does just that. Second, Birleson explicitly describes generating a select signal in response to the user changing the channel. Ex. 1015, 11:20. Claim 27 is obvious.

**E. Ground 5: Claims 18 and 19 are Obvious**

**1. Claim 18 Recites Notoriously Well Known Circuit Techniques**

Despite its many words, claim 18 simply recites two notoriously well known design techniques—signal multiplexing and differential signaling—in a multi-format television architecture. Petitioner's expert provided a rational basis for using both in light of Oku, Ericsson and Nguyen. Oku provides the basic output driver architecture that shows a DAC followed by a driver circuit that is specific to a particular device. Oku also shows that a single DAC can drive multiple drivers. Petition at 52. As Dr. Holberg explained, claim 18 is simply an obvious variation of this basic DAC-driver architecture. Ex. 1009 at ¶¶76–89.

Patent Owner argues that the proposed combination fails because Oku only describes a single-ended output, rather than a differential one. POR at 52. Oku does not describe the outputs of the driver circuits as single ended; Oku is agnostic. Holberg Supp., ¶64. Oku leaves it to the designer to select the signaling that is

appropriate under the circumstances. According to Dr. Holberg, a POSITA would have been motivated to select a differential output for the digital television output because of the high data rate of that signal in order to improve the fidelity of the signal. *Id.*

Patent Owner next argues that Petitioner failed to provide a reason to combine Oku with Thomson and Harris. POR at 53. That is wrong. Thomson only describes a television tuner, not a complete television. Even Patent Owner's expert admits that additional components would be necessary to reproduce the transmitted video and audio. Ex. 1060 at 140:3–13. To convert the digital output of the Thomson receiver, a POSITA would understand that the digital signals would need to be converted back to analog signals before they could be reproduced on a screen or a speaker. *Id.* at 140:17–25. Oku's output architecture provides a natural fit for that application because, like Thomson, it too is focused on television signals in both "analog and digital broadcasts." Ex. 1018 at 1. A POSITA would have naturally looked to Oku because of its "high picture quality." Holberg Supp., ¶65.

Patent Owner next argues that Oku does not teach providing a differential output of "***both*** video ***and*** audio information." POR at 54. Patent Owner fails to recognize that this follows naturally from the digital format of the television signal

in Thomson. As Dr. Holberg explained, the digital television format in Thomson is encoded using the MPEG format, which includes both video and audio. Ex. 1009, ¶54. As a result, the digital output of the Thomson digital demodulator includes both video and audio information, which would be reproduced by the output circuit of Oku. Holberg Supp., ¶66.

All that remains of claim 18 is time division multiplexing the analog television signals and the digital television signals onto the same output terminals. As Dr. Holberg explained, a POSITA would have been motivated to implement the output circuit in this way to reduce the pin count of the resulting circuit. Ex. 1009, ¶88. Such a practical, common-sense, cost-savings decision is the epitome of obviousness.

## **2. Low Pass Filtering a DAC Output is Notoriously Well Known**

Claim 19 adds a low-pass filter between the DAC and the output driver circuit. Patent Owner argues that such a filter is unnecessary because the “signal has already been bandwidth limited.” POR at 56. As Dr. Holberg explains, however, converting the signal back to an analog signal introduces higher frequency components that need to be removed to produce a smoother waveform. Holberg Supp., ¶69. That is why the use of LPFs downstream of DACs is notoriously well known in the art. *Id.* at ¶¶69–76 (citing Ex. 1059 at 28-29).

Dated: February 12, 2016

/Peter J. Ayers/

Peter J. Ayers, Reg. No. 38,374  
LEE & HAYES, PLLC  
11501 Alterra Parkway, Suite 450  
Austin, TX 78758  
Phone: (512) 605-0252  
Facsimile: (512) 605-0252  
Email: [peter@leehayes.com](mailto:peter@leehayes.com)

*Attorneys for Petitioner  
Silicon Laboratories, Inc.*

**CERTIFICATE OF SERVICE**

I hereby certify that on this 12th day of February, 2016, the foregoing **PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE** was served upon Patent Owner's attorney of record by emailing to the following addresses:

Michael R. Fleming  
Lead Counsel for Patent Owner  
Irell & Manella LLP  
1800 Avenue of the Stars  
Suite 900  
Los Angeles, CA 90067  
[CrestaIPRs@irell.com](mailto:CrestaIPRs@irell.com)

Benjamin Haber  
Backup Counsel for Patent Owner  
Irell & Manella LLP  
1800 Avenue of the Stars  
Suite 900  
Los Angeles, CA 90067  
[CrestaIPRs@irell.com](mailto:CrestaIPRs@irell.com)

Mihai Murgulescu  
Cresta Technology Corporation  
3900 Freedom Circle, Suite 201  
Santa Clara, CA 95054  
[Mihai.murgulescu@crestatech.com](mailto:Mihai.murgulescu@crestatech.com)

/Peter J. Ayers/

Peter J. Ayers, Reg. No. 38,374  
LEE & HAYES, PLLC