

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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TCL Industries Holdings (H.K.) Limited
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Shenzhen TCL New Technology Co., Ltd.
TCL Optoelectronics Technology (Huizhou) Co., Ltd.
TCL Overseas Marketing Ltd.
TCL Technology Group Corporation (f/k/a TCL Corp.),
Petitioners

v.

LG Electronics Inc.,
Patent Owner

Case No. IPR2023-00461

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 7,839,452**

TABLE OF CONTENTS

Table of Authorities	vii
Petitioner’s Exhibit List	viii
I. Introduction.....	1
II. Mandatory Notices.....	2
A. Real Parties-in-Interest	2
B. Related Matters.....	3
C. Lead and Back-Up Counsel.....	4
D. Service Information	4
E. Payment of Fees	4
III. Requirements for <i>Inter Partes</i> Review under 37 C.F.R. § 42.104	5
A. Grounds for Standing	5
B. Claims for Which Review Is Requested	5
C. Statutory Grounds of Challenge	5
D. Claim Constructions	6
E. Supporting Evidence	6
IV. The ’452 Patent.....	6
A. Summary of the ’452 Patent.....	6
B. Applicant Admitted Prior Art (“AAPA”)	11
C. Summary of the Prosecution History of the ’452 Patent	12
D. Level of Ordinary Skill in the Art	13
V. Overview OF The Prior Art.....	13
A. Mitani	13
B. Oku	19
C. Abe	21
VI. Detailed Grounds of Unpatentability.....	23

A.	Ground 1: Claims 1-3 and 5-17, 19-21, and 23 of the '452 patent Would Have Been Obvious in View of the Combination of Mitani and Oku	24
1.	Independent Claim 1	24
2.	Claim 2: “The digital television as defined in claim 1, wherein the data processing part comprises a bitmap converter configured to determine whether the text data is the bit map data and that converts the text data into the bit map data, based upon the determined result and a bit map compressor configured to compress the bit map data by using compression coding.”	33
3.	Claim 3: “The digital television as defined in claim 2, wherein the data processing part further comprises a bit map decompressor configured to read the compressed bit map data from the memory to thereby restore the read data to its original bit map data and a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution.”	37
4.	Claim 5: “The digital television as defined in claim 2, wherein the bit map converter converts the text data into the bit map data, if it is determined that the text data is not the bit map data.”	38
5.	Claim 6: “The digital television as defined in claim 2, wherein the bit map converter bypasses the text data, if it is determined that the text data is the bit map data.”	40
6.	Claim 7: “The digital television as defined in claim 2, wherein the predetermined compression coding is a run-length compression coding.”	40
7.	Claim 8: “The digital television as defined in claim 1, wherein the text data is at least one among HTML data, DHTML data, XML data, SGML data and bit map data.”	41
8.	Claim 9: “The digital television as defined in claim 1, wherein the memory stores first bit map data or second bit map data.”	41

9.	Claim 10: “The digital television as defined in claim 1, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data.”.....	42
10.	Claim 11: “The digital television as defined in claim 1, wherein the display displays different resolution images.”.....	42
11.	Independent Claim 12.....	43
12.	Claim 13: “The digital television as defined in claim 12, wherein the text data is at least one among HTML data, DHTML data, XML data, SGML data and bit map data.”.....	45
13.	Claim 14: “The digital television as defined in claim 12, wherein the bit map converter converts the text data into bit map data if it is determined that the text data is not bit map data.”.....	45
14.	Claim 15: “The digital television as defined in claim 12, wherein the bit map converter bypasses the text data if it is determined that the text data is bit map data.”.....	45
15.	Claim 16: “The digital television as defined in claim 12, wherein the predetermined compression coding is a run-length compression coding.”.....	45
16.	Claim 17: “The digital television as defined in claim 12, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data previously stored in the memory.”.....	45
17.	Claim 19: “The digital television as defined in claim 12, wherein the display displays different resolution images.”.....	46
18.	Independent Claim 20.....	46
19.	Claim 21: “The digital television as defined in claim 20, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data previously stored in the memory.”.....	47
20.	Claim 23: “The digital television as defined in claim 20, wherein the display displays different resolution images.”.....	47
B.	Ground 2: Claims 1 and 8-11 of the ’452 Patent Would Have Been Obvious in View of Abe and the AAPA.....	47

1.	Independent Claim 1	48
2.	Claim 8: “The digital television as defined in claim 1, wherein the text data is at least one among HTML data, DHTML data, XML data, SGML data and bit map data.”	55
3.	Claim 9: “The digital television as defined in claim 1, wherein the memory stores first bit map data or second bit map data.”	55
4.	Claim 10: “The digital television as defined in claim 1, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data.”	55
5.	Claim 11: “The digital television as defined in claim 1, wherein the display displays different resolution images.”	56
C.	Ground 3: Claims 2, 3, 5-7 and 12-17, 19-21 and 23 of the ’452 Patent Would Have Been Obvious Over Abe Modified in View of AAPA and Oku	56
1.	Claim 2: “The digital television as defined in claim 1, wherein the data processing part comprises a bit map converter configured to determine whether the text data is the bit map data and that converts the text data into the bit map data, based upon the determined result, and a bit map compressor configured to compress the bit map data by using compression coding.”	56
2.	Claim 3: “The digital television as defined in claim 2, wherein the data processing part further comprises a bit map decompressor configured to read the compressed bit map data from the memory to thereby restore the read data to its original bit map data, and a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution.”	60
3.	Claim 5: “The digital television as defined in claim 2, wherein the bit map converter converts the text data into the bit map data, if it is determined that the text data is not the bit map data.”	66
4.	Claim 6: “The digital television as defined in claim 2, wherein the bit map converter bypasses the text data, if it is determined that the text data is the bit map data.”	67

5.	Claim 7: “The digital television as defined in claim 2, wherein the predetermined compression coding is a run-length compression coding.”	67
6.	Independent Claim 12	68
7.	Claim 13: “The digital television as defined in claim 12, wherein the text data is at least one among HTML data, DHTML data, XML data, SGML data and bit map data.”	69
8.	Claim 14: “The digital television as defined in claim 12, wherein the bit map converter converts the text data into bit map data if it is determined that the text data is not bit map data.”	69
9.	Claim 15: “The digital television as defined in claim 12, wherein the bit map converter bypasses the text data if it is determined that the text data is bit map data.”	69
10.	Claim 16: “The digital television as defined in claim 12, wherein the predetermined compression coding is a run-length compression coding.”	69
11.	Claim 17: “The digital television as defined in claim 12, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data previously stored in the memory.”	70
12.	Claim 19: “The digital television as defined in claim 12, wherein the display displays different resolution images.”	70
13.	Independent Claim 20	70
14.	Claim 21: “The digital television as defined in claim 20, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data previously stored in the memory.”	71
15.	Claim 23: “The digital television as defined in claim 20, wherein the display displays different resolution images.”	72
VII.	The Board Should Not Exercise Its Discretion To Deny Institution.....	72
A.	35 U.S.C. § 314(a).....	72
1.	Factor 1: The parallel proceeding is not stayed, and it is unknown whether a stay would be granted.....	72

2.	Factor 2: The trial will commence after the due date of a Final Written Decision	73
3.	Factor 3: The parties' investments in the parallel proceeding weigh in favor of institution.....	74
4.	Factor 4: IPR will address issues not raised in the parallel proceeding.....	75
5.	Factor 5: PO and Petitioners are parties in the parallel proceeding.....	76
6.	Factor 6: Other circumstances weigh in favor of institution	76
B.	35 U.S.C. § 325(d).....	77
I.	Conclusion	77

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<i>Acuity Brands Lighting, Inc. v. Ultravision Technologies, LLC</i> , IPR2020-01638, Paper 8 (PTAB May 6, 2021)	76
<i>Apple Inc. v. Fintiv, Inc.</i> , IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential)	72, 75
<i>Arctic Cat Inc. v. GEP Power Prods., Inc.</i> , 919 F.3d 1320 (Fed. Cir. 2019)	24
<i>Cisco Sys., Inc. v. Estech Sys., Inc.</i> , IPR2021-00333, Paper 12 (PTAB July 7, 2021)	73
<i>Dish Network L.L.C. v. Broadband iTV, Inc.</i> , IPR2020-01332, Paper 14 at 21-26 (PTAB Jan. 27, 2021)	74
<i>Dish Network L.L.C. v. Broadband iTV, Inc.</i> , IPR2020-01332, Paper 14 at 30-31 (PTAB Jan. 27, 2021)	77
<i>Hanwha Solutions Corp. v. REC Solar Pte. Ltd.</i> , IPR2021-00989, Paper 12 (PTAB Dec. 13, 2021)	75, 77
<i>HP Inc. v. Slingshot Printing LLC</i> , IPR2020-01084, Paper 13 (PTAB Jan. 13, 2021)	77
<i>KSR Int'l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007)	31, 32, 35, 52, 58

Statutes

35 U.S.C. § 314(b)	75
35 U.S.C. § 325(d)	78

Regulations

37 C.F.R. § 42.100(b)	74
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PETITIONER’S EXHIBIT LIST

Exhibit	Description
1001	U.S. Patent No. 7,839,452 (the “’452 patent”); Applicant Admitted Prior Art (“AAPA”)
1002	Prosecution History for U.S. Patent No. 7,839,452
1003	European Patent Application Pub. No. EP 0700211 (“Mitani”)
1004	Japanese Patent Publication JP-9-275563 (“Oku”) (Certified translation)
1005	U.S. Patent No. 5,734,436 (“Abe”)
1006	Reserved
1007	Joseph P. Havlicek Declaration
1008	Joseph P. Havlicek CV
1009	Reserved
1010	In the Matter of Reallocation of Television Channels 60-69, the 46-806 MHz Band, ET Docket No. 97-157, FCC (January 6, 1998)
1011	Telecommunications Act of 1996, Public Law 104-104, February 8, 1996
1012	ANSI ISO-IR-006 ASCII Graphic Character Set (1975)
1013	U.S. Pat. No., 5,109,279
1014	Updated Guidance on the Treatment of Statements of the Applicant in the Challenged Patent in Inter Partes Reviews under 35 U.S.C. §311, June 9, 2022.
1015	Plaintiff’s Preliminary Claim Constructions and Extrinsic Evidence [N.D.Cal. Patent L.R. 4-2]
1016	Docket Control Order
1017	Average Time to Trial
1018	Foley et al., <i>Computer Graphics</i> (2 ed. 1997) [LG-HISENSE00050051-85]
1019	D. Hearn and M.P. Baker, <i>Computer Graphics</i> (2 ed. 1996)
1020	A. Bouridane, et al., “A parallel implementation of a novel cubic interpolation technique for visual analysis,” IEEE ISIE, 1993, pp. 565-570, doi: 10.1109/ISIE.1993.268743
1021	W.K. Carey, D.B. Chuang, and S.S. Hemami, “Regularity-preserving image interpolation,” IEEE ICIP, 1997, pp. 901-904, doi: 10.1109/ICIP.1997.648112

Exhibit	Description
1022	T. Nakayama, “Content-oriented categorization of document images,” <i>16th Conference on Computational Linguistics</i> , ACM, 1996, pp. 818-823.
1023	G.-H. Cha and C.-W. Chung, “Object-oriented retrieval mechanism for semistructured image collections,” <i>6th ACM International Conference on Multimedia</i> , ACM, 1998, pp. 323-332.
1024	L.J. Guibas and J. Stolfi, “A language for bitmap manipulation,” <i>ACM Trans. Graph.</i> , vol. 1, no. 3, July 1982, pp. 191-214.
1025	F. Rabitti and P. Stanchev, “An approach to image retrieval from large image databases,” <i>10th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval</i> , ACM, 1987, pp. 284-295.
1026	R. Pike, “Graphics in overlapping bitmap layers,” <i>ACM Trans. Graph.</i> , vol. 2, no. 2, April 1983, pp. 135–160.
1027	FINTIV Stipulation
1028	Complaint

I. INTRODUCTION

Petitioners request *Inter Partes* Review (“IPR”) of claims 1-3, 5-17, 19-21, and 23 of U.S. Patent No. 7,839,452 (“the ’452 patent,” Ex. 1001).

The ’452 patent relates to displaying on-screen text, such as closed captioning or program guide information, mixed with image data at different screen resolutions. Ex. 1001, 1:15-19; 2:62-3:3. The ’452 patent criticizes prior art digital televisions, saying while they could receive on-screen text (“text data”) and convert the text into a graphical (“bitmap”) format for display, prior art televisions could not resize these bitmaps depending on the resolution of the display. *Id.*, 2:62-3:3. The ’452 patent explains prior art devices would need to store separate bitmaps for every display resolution used by the display. The ’452 patent purports to reduce memory demands through “format conversion,” by using one or a few fixed-size bitmaps for text data and resizing that bitmap based on display resolution. *Id.*, 7:21-24; 7:49-8:32.

However, receiving text data in bitmap format or converting text data into a graphical bitmap for display on-screen was well-known in the prior art. Resizing a bitmap to account for display resolution was also known well before the invention of the ’452 patent as shown in prior art references such as Mitani, Ex. 1003, and Abe, Ex. 1005, both relied on herein. These references teach converting character

codes to bitmaps and resizing those bitmaps based on resolution of a television screen.

Additionally, the '452 patent states memory use can be further reduced by “compressing” bitmaps in memory. Compression means replacing a larger number of bits in memory with a smaller number of bits. Ex. 1007, ¶¶33-34. The '452 patent acknowledges data compression was routinely used in the art for other aspects of digital television. Specifically, compression was instrumental to enable transmission and display of high-resolution digital video images. Ex. 1001, 1:28-47 (“a digital TV compresses video data and audio data with the MPEG technology ...”). Using compression to reduce memory requirements for storing bitmaps and decompressing a stored bitmap to its original format were well-known in the prior art, for example in Oku, Ex. 1004.

Thus, the '452 patent discloses and claims combinations of known bitmap compression/decompression and resizing technology as used in digital televisions. Accordingly, Petitioners respectfully request the Board institute *inter partes* review and cancel the challenged claims.

II. MANDATORY NOTICES

A. Real Parties-in-Interest

Petitioners identify TCL Electronics Holdings Ltd. (f/k/a TCL Multimedia Technology Holdings, Ltd.), TCL Industries Holdings Co., Ltd., TCL Industries

Holdings (H.K.) Limited, TTE Technology, Inc. (d/b/a TCL North America), TTE Corporation, TCL Moka International Limited, TCL Moka Manufacturing S.A. de C.V., TCL King Electrical Appliances (Huizhou) Co. Ltd., Manufacturas Avanzadas S.A. de C.V., TCL Smart Device (Vietnam) Co., Ltd., Shenzhen TCL New Technology Co., Ltd., TCL Optoelectronics Technology (Huizhou) Co., Ltd., TCL Overseas Marketing Ltd., TCL Technology Group Corporation (f/k/a TCL Corp.) as the real parties-in-interest.

B. Related Matters

As of the filing date of this petition, the '452 patent is involved in litigation in the Eastern District of Texas, captioned *LG Electronics Inc. v. TCL Electronics Holdings Ltd. (f/k/a TCL Multimedia Technology Holdings, Ltd.) et al.*, Case No. 2:22-cv-00122-JRG.

The '452 patent was asserted in *LG Electronics Inc. v. Hisense Electronics Manufacturing Company of America Corporation et al.*, filed in the United States District Court for the Central District of California on November 4, 2019, (case #: 2:19-cv-09474-JAK-E, the "9474 case"), which was dismissed on March 19, 2021. The '452 patent was the subject of IPR2020-01208 (the "1208 IPR") filed on June 30, 2020, and terminated on April 7, 2021, after a decision granting institution of inter partes review.

Petitioners are not aware of any other judicial or administrative matter involving the '452 patent.

C. Lead and Back-Up Counsel

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E. Payment of Fees

The required fees are submitted herewith. If additional fees become due during this proceeding, the Office is authorized to charge such fees to Deposit Account No. 60-3815.

III. REQUIREMENTS FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. § 42.104

A. Grounds for Standing

Petitioners certify that the '452 patent is available for IPR and Petitioners are not barred or estopped from requesting IPR challenging the claims under 37 C.F.R. § 42.101.

B. Claims for Which Review Is Requested

Petitioners request review of claims 1-3, 5-17, 19-21, and 23.

C. Statutory Grounds of Challenge

Petitioners identify the statutory grounds on which the challenges are based as follows:

Ground	Statute	Reference(s)	Claim(s)
1	35 U.S.C. § 103	Mitani (Ex. 1003) in view of Oku (Ex. 1004)	1-3, 5-17, 19-21, 23.
2	35 U.S.C. § 103	Abe (Ex. 1005) in view of Applicant Admitted Prior Art (AAPA)	1 and 8-11
3	35 U.S.C. § 103	Abe in view of AAPA and Oku	2, 3, 5-7, 12-17, 19-21, 23.

The earliest priority date of the '452 patent is August 8, 2000. *See* Ex. 1001, (30). Mitani was published March 6, 1996; Oku was published October 21, 1997; and Abe issued March 31, 1998. These dates are each more than one year before

the earliest priority date of the '452 patent and are prior art under at least pre-AIA 35 U.S.C. §§ 102(a) and (b).

D. Claim Constructions

Petitioners believe the claims of the '452 patent should be interpreted according to their plain and ordinary meaning as would have been understood by a POSITA in light of the claim language, the specification, and the prosecution history. Ex. 1007, ¶¶50-51.

E. Supporting Evidence

Petitioners identify exhibit numbers of the supporting evidence relied upon to support the challenges in section VI, *infra*, and in Petitioners' Exhibits List, *supra*.

IV. THE '452 PATENT

A. Summary of the '452 Patent

The '452 patent relates to converting the “format” of text data to be displayed on a TV with video data. Ex. 1001, 1:15-19. The challenged claims are directed to a display that converts text formatted as bitmap data to different resolutions and mixes the bitmap data with image data for display. This is shown in annotated FIG. 4, where “image data” is identified in the green box and text data is identified with blue and yellow arrows. Ex. 1007, ¶¶37-38.

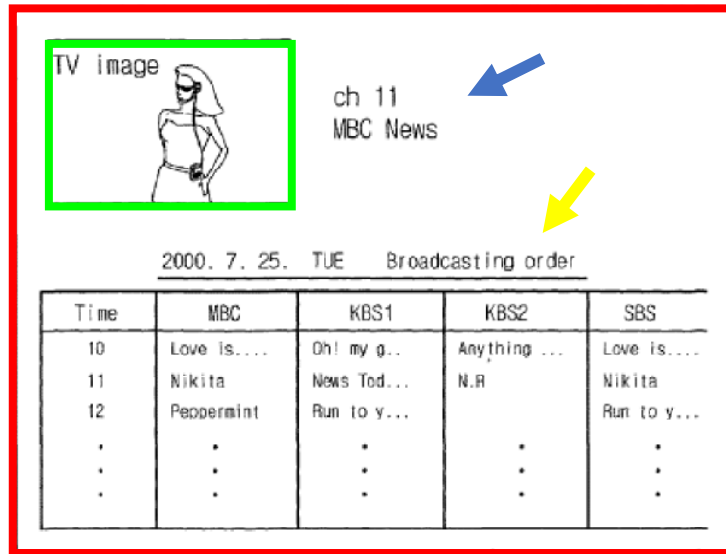
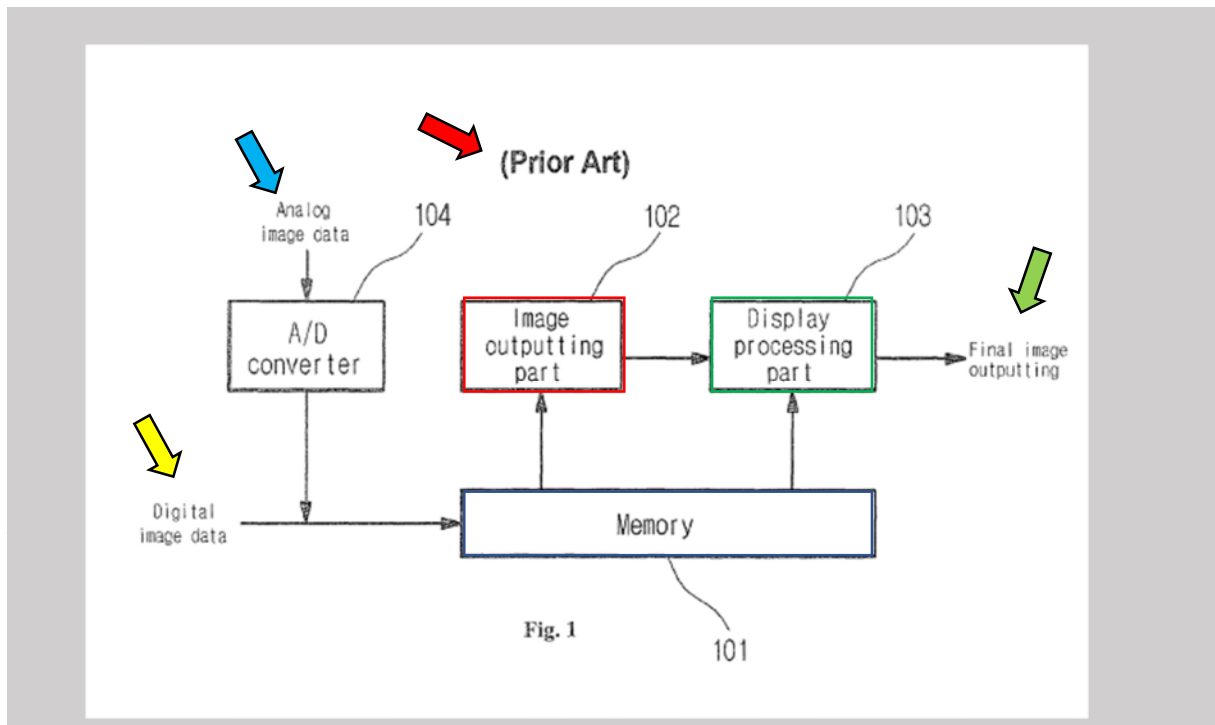


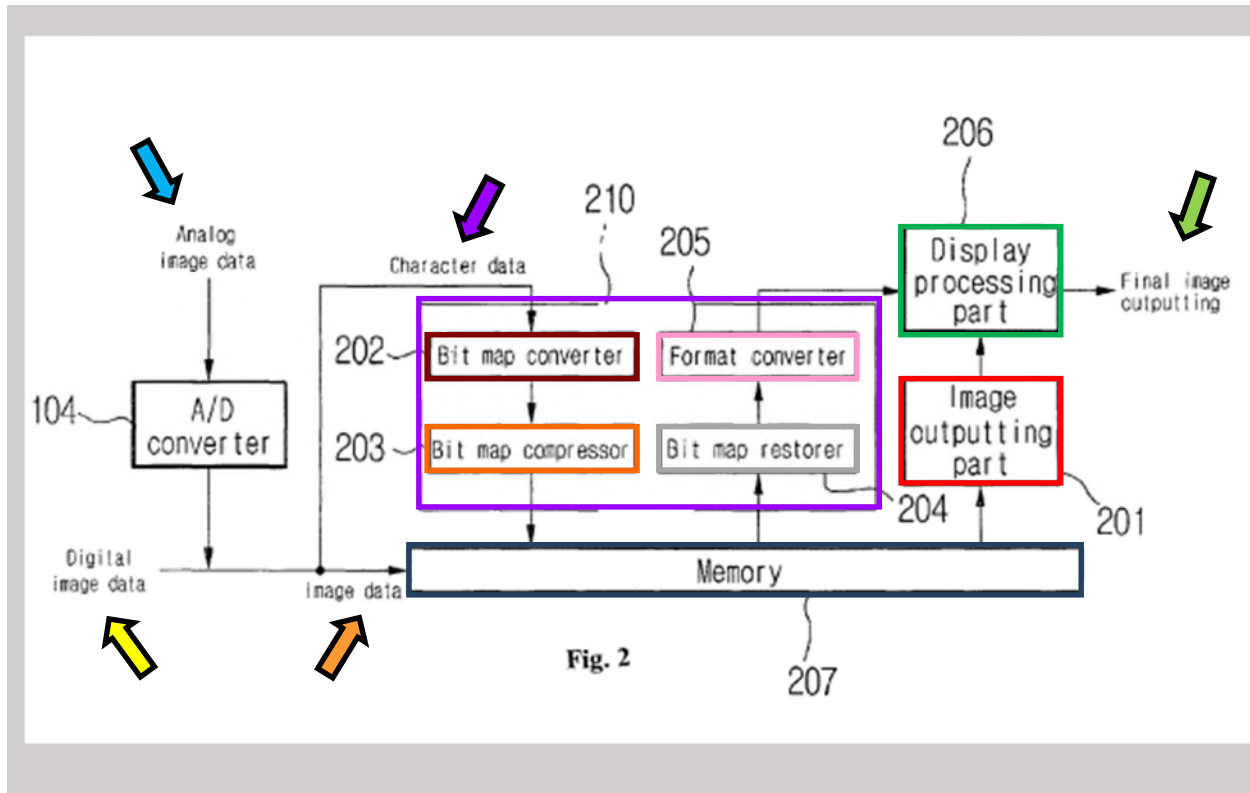
Fig. 4

Ex. 1001, FIG. 4 (emphasis added).

FIG. 1 is a block diagram illustrating a conventional image display device in a digital TV and it should be contrasted with FIG. 2, which is a block diagram illustrating an image display device in a digital TV according to an embodiment of the alleged invention. Ex. 1001, 5:1-5.



Ex. 1001, FIG. 1 (annotated).



Ex. 1001, FIG. 2(annotated).

In annotated FIG. 1 and FIG. 2, the A/D converter 104, memory (blue box; 101 in FIG. 1 and 207 in FIG. 2), image outputting part (red box; 102 in FIG. 1 and 201 in FIG. 2), and display processing part (green box; 103 in FIG. 1 and 206 in FIG. 2) all function in an identical or substantially similar way both in the AAPA device depicted in annotated FIG. 1 and in the embodiment of the image display device depicted in annotated FIG. 2. Ex. 1007, ¶¶39-41.

If the text data is not bitmap data, the data is converted to a bitmap format by bitmap converter 202 and compressed by bitmap compressor 203 using

conventional compression algorithms such as run length coding before being stored in memory 207. Ex. 1001, 7:34-35, 6:1-2, 4:12-14. The '452 patent concedes that bitmap conversion of text data was known in conventional digital televisions. *Id.*, 2:29-31. The claimed bitmap compressor reduces the memory used to store bitmap-converted text data. *Id.*, 5:65-6:15, 7:31-37; 9:33-35.

When the bitmap data is to be displayed, the bitmap restorer 204 retrieves a compressed bitmap from the memory 207 and decompresses the data to restore the original bitmap. *Id.*, 6:16-22, 7:38-44. A format converter 205 then converts the bitmap data into a display resolution suitable for display on a TV. Ex. 1001, 6:23-34; Ex. 1007, ¶¶43-44.

In the exemplary embodiment, format conversion entails multiplying the height or width of the bitmap data by a real number, in order to stretch or shrink the bitmap to fit the display resolution of the television. Ex. 1001, 7:46-48, *id.*, ¶45.

Table 1 shows sample display resolutions and real number conversion factors that can be used for performing this multiplication:

Display Resolution	First Bit Map Data (720 × 480, H × 1:V × 1)	Second Bit Map Data (960 × 540)
1920 × 1080	1920 × 1080 (H × 2.67:V × 2.25)	1920 × 1080 (H × 2:V × 2)
1280 × 720	1280 × 720 (H × 1.78:V × 1.5)	1280 × 720 (H × 2:V × 2)
854 × 480	854 × 480 (H × 1.19:V × 1)	854 × 480 (H × 0.89:V × 0.89)
720 × 480	720 × 480 (H × 1:V × 1)	720 × 480 (H × 0.75:V × 0.89)

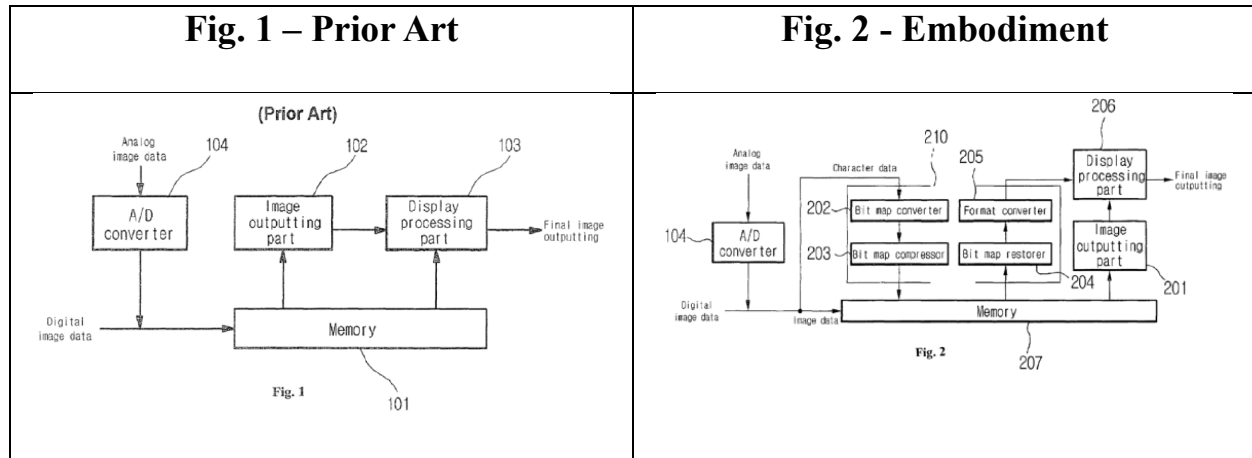
Ex. 1001, 7:56-67.

Table 1 depicts bit map data with resolutions of 720x480 pixels and 960x540. These bitmaps have different conversion factors to resize the bitmap to fit different display resolutions. Ex. 1001, 8:1-24. For example, the 960x540 second bit map data can be converted into a 720x480 display resolution by multiplying the horizontal (width) by 0.75 and the vertical (height) by 0.89. *Id.* While this example uses two bitmap data, a single bitmap data may be used. *Id.*, 8:25-33.

According to the '452 patent, without the format converter, a display would need to store one copy of a bitmap for every supported display resolution. Ex. 1001, 3:29-36. By generating a single bitmap, storing it in memory, and converting it to the resolution of the display, less memory is allegedly used. *Id.*, 6:35-40, Ex. 1007, ¶44.

B. Applicant Admitted Prior Art (“AAPA”)¹

Fig. 1 of the ’452 patent is labeled “Prior Art” and includes many of the elements also found in the embodiment of Fig. 2. Ex. 1007, ¶¶39, 40, 88-97.



Ex. 1001, Figs. 1 and 2.

Features admitted being conventional include:

¹ The Updated Guidance on the Treatment of Statements of the Applicant in the Challenged Patent in *Inter Partes* Reviews under 35 U.S.C. §311, June 9, 2022, provides that a “Ground is complaint with the Updated Guidance for use of AAPA in an IPR: If an IPR petition relies on admissions in combination with reliance on one or more prior art patents or printed publications, those admissions do not form “the basis” of the ground and must be considered by the Board in its patentability analysis.” *citing Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1377 (Fed. Cir. 2022). Ex. 1014 at 4.

- a digital television,
- memory,
- A/D converter,
- an image outputting part that reads image data from a memory, *id.*, 2:32-33;
- a display processing part that mixes image data with bitmap data. *Id.*, 2:40-45.
- receiving “digital [or] analog broadcasting,” Ex. 1001, 2:23-47, and
- bitmap conversion of text into bitmaps stored in memory, *id.*, 2:27-31.

These are the same names used for the elements performing the same function in the embodiments of the alleged invention of the ’452 patent.

C. Summary of the Prosecution History of the ’452 Patent

As originally filed, the ’452 patent included 14 claims. Ex. 1002 at 33 (April 18, 2007, Claims). These were cancelled and claims 15-37 were added. Ex. 1002 at 77 (December 4, 2007, Claims).

The examiner rejected Claims 15-20, 22, and 24-26 under 35 U.S.C. 102(b) as being anticipated by Chui et al, U.S. Pat. No. 5,600,373 and Claims 21, 23, and 27-37 under 35 U.S.C. 103(a) as obvious in view of Chui et al, U.S. Pat. No. 5,600,373. Ex. 1002 at 84-89 (January 7, 2010, Non-Final Rejection).

In response, applicants amended claim 15 as “~~character~~ text data to be displayed on the display”. Ex. 1002 at 99 (April 7, 2010, Claims). Applicants stated that there “is no disclosure whatsoever in Chui of a processing part configured to execute bit map conversion and format conversion for text data to be displayed on the display.” Ex. 1002 at 106 (April 7, 2010 Applicant Arguments/Remarks Made in an Amendment). Thereafter, the examiner issued a Notice of Allowance. Ex. 1002 at 130 (July 26, 2010 Notice of Allowance and Fees Due).

D. Level of Ordinary Skill in the Art

A POSITA at the time of the alleged invention of the '452 patent would have had a bachelor's degree in computer graphics, display signal processing, or similar field of study, and several years (e.g., 5-6) of experience working with digital display technology. Ex. 1007, ¶17.

V. OVERVIEW OF THE PRIOR ART

A. Mitani

Mitani describes a television displaying image data mixed with text, and one embodiment converts teletext data received in a broadcast signal into bitmaps. Ex. 1003, 2:5-9, 26:21-27:16. “Teletext” is text and graphics transmitted in a television signal. Ex. 1007, ¶29. Mitani explains that text characters are represented by codes:

FIG.10
(PRIOR ART)

					b6	0	0	0	0	1	1	1	1
					b5	0	0	1	1	0	0	1	1
					b4	0	1	0	1	0	1	0	0
					COLUMN								
b3	b2	b1	b0	ROW	0	1	2	3	4	5	6	7	
0	0	0	0	0			SP	0	@	P		p	
0	0	0	1	1			!	1	A	Q	a	q	
0	0	1	0	2			"	2	B	R	b	r	
0	0	1	1	3			#	3	C	S	c	s	
0	1	0	0	4			¥	4	D	T	d	t	
0	1	0	1	5			%	5	E	U	e	u	
0	1	1	0	6			&	6	F	V	f	v	
0	1	1	1	7			'	7	G	W	g	w	
1	0	0	0	8			(	8	H	X	h	x	
1	0	0	1	9			)	9	I	Y	i	y	
1	0	1	0	10			*	:	J	Z	j	z	
1	0	1	1	11			+	;	K	[	k		
1	1	0	0	12			,	<	L	'	l		
1	1	0	1	13			-	=	M	]	m		
1	1	1	0	14			.	>	N	^	n	—	
1	1	1	1	15			/	?	O	—	o	DEL	

Ex. 1003, FIG. 10 (emphasis added).

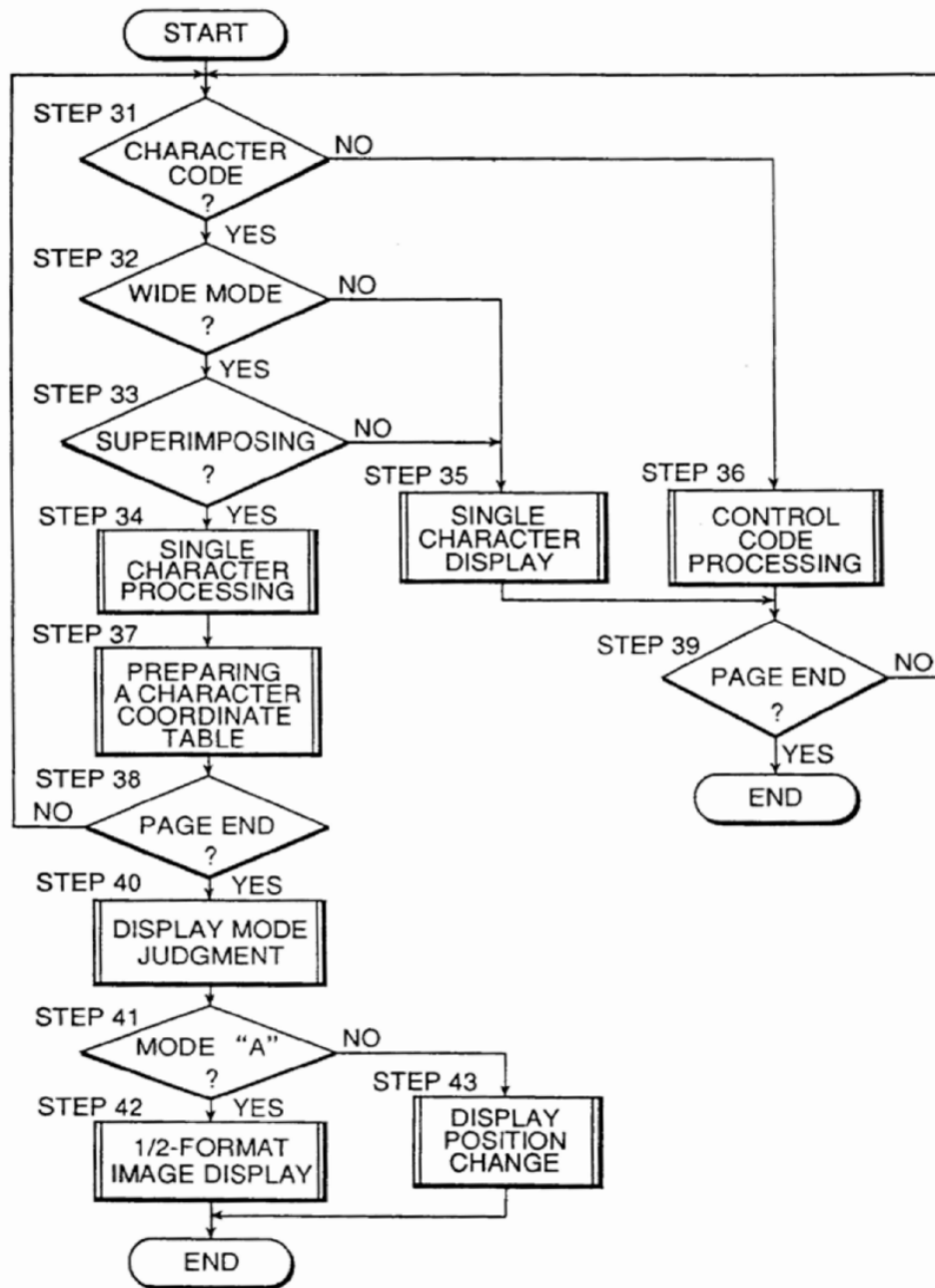
FIG. 10 shows, for example, the letter “A” having a code represented by binary 100 0001 (highlighted in yellow). Ex. 1007, ¶65.

Mitani converts teletext character codes into bitmaps for display by outputting “dot patterns” representing characters corresponding to character codes. Ex. 1003, 21:58-22:1. The ’452 patent refers to a bitmap as a number or pattern of

dots where each dot is represented by a number of bits representing available colors. Ex. 1001, 3:22-28. A POSITA would understand that a “dot pattern” referred to in Mitani is a bitmap. Ex. 1007, ¶73. Mitani also equates “dots” with “pixels,” and a POSITA would recognize that a pixel is a “picture element” or a dot that has an associated color value. Ex. 1003, 24:33-36, Ex. 1007, ¶73.

Mitani addresses the display of teletext data on widescreen displays. Ex. 1003, 8:57-9:1, 9:26-31; Ex. 1007, ¶¶66-72. In a widescreen television when teletext character codes are converted into a bitmap, the top and bottom portions may be cut off. Ex. 1003, 26:21-28. FIG. 27 of Mitani discloses an algorithm to generate a bitmap and to convert the bitmap to a format to fit a widescreen display by changing the height:

FIG.27



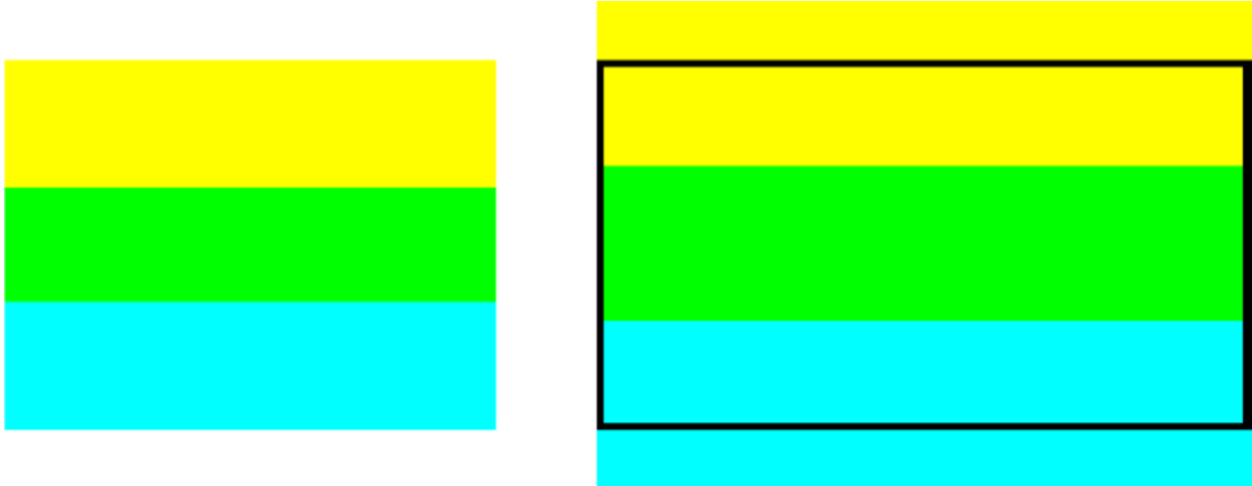
Ex. 1003, FIG. 27.

Step 31 determines if the received data is a code representing text data. *Id.*, 26:38-39. If so, step 32 determines whether the television is in widescreen display mode. *Id.*, 26:40-41. If so, step 33 checks if the current display mode

superimposes the text data on a television image, as opposed to a mode that only displays text. *Id.*, 26:41-44. If so, then processing continues to step 34, “single character processing.” Here “[a] character is decoded and character font data is written into an image memory but it is not displayed.” *Id.*, 26:45. “Single character processing” converts character codes into “dot patterns” (bitmaps). Ex. 1007, ¶¶72, 124-126. In step 37, Mitani describes making a “character coordinate table”

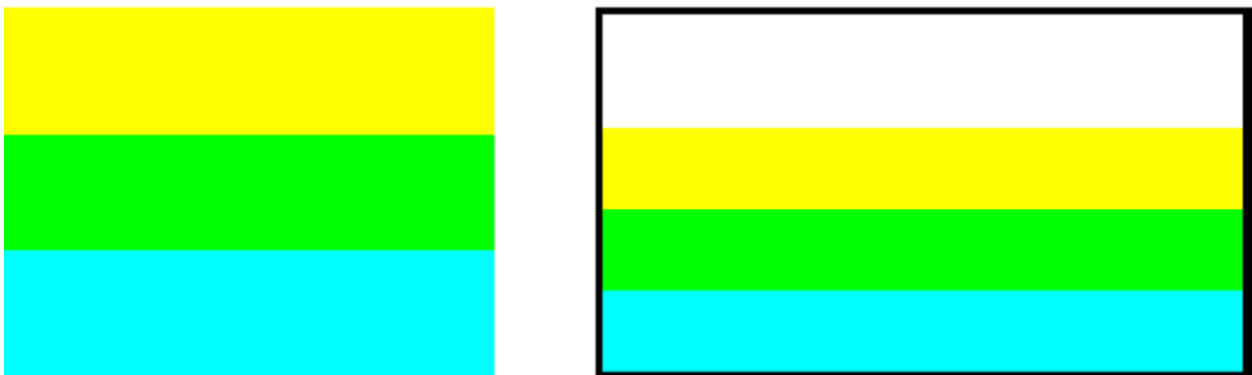
When displaying the image memory bitmap of characters, Mitani determines the location of characters and how they are to be presented on the screen, in step 40. Ex. 1003, 26:51-52. Mitani describes three widescreen “modes,” called A, B, and C. “Mode B” is set when characters are present only in the top third of the table, “Mode C” is set when characters are present only in the bottom third of the table, and “Mode A” otherwise. Ex. 1003, 26:57-27:10; Ex. 1007, ¶¶74-77.

The following schematic diagram shows the display regions used to determine the display mode in Mitani:



Ex. 1007, FIG. 3, ¶¶66.

The left illustration represents a page of teletext data shown at a normal aspect ratio, and the right shows the same page enlarged to fit a widescreen display. In FIG. 27, when the yellow (top) and blue (bottom) regions both include text, Mitani converts the bitmap by applying “½-format image display” (step 42). Outputting using “½-format image display” reduces the vertical size of the teletext bitmap data by a factor of 2, which is the same as shrinking the image vertically by a factor of 50%, or multiplying by 0.50. Ex. 1003, 26:53-57; Ex. 1007 at, ¶¶66-77. The following diagram illustrates how converting the format of text data allows the entire teletext page to be displayed. *Id.*

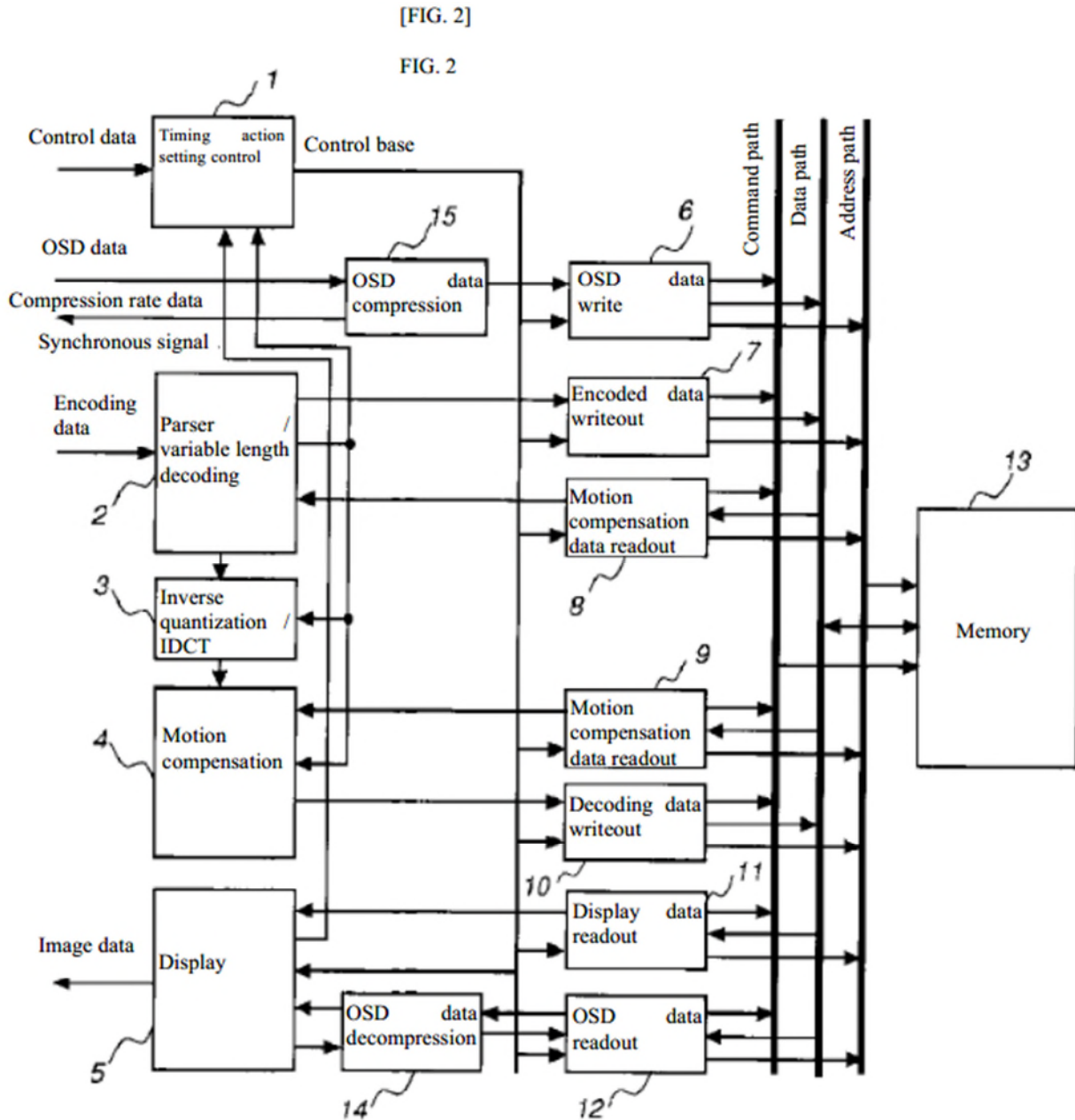


Ex. 1007, FIG. 4., ¶¶66-67.

B. Oku

Oku relates to a television decoder device used to process on-screen display (“OSD”) data to overlay the OSD data on digital video signals being displayed on a television. Ex. 1004, ¶¶1-2. Oku’s “overlay” refers to placing characters and graphics on top of video image data, such as to make a user interface. According to Oku, “an OSD (On Screen Display) method that overlays and displays characters and graphics on the decoded image is effective as a user interface of a decoding device for compressed image data.” Ex. 1004, ¶8; Ex. 1007, ¶¶78-81.

The decoder circuit is shown in Oku FIG. 2:



Ex. 1004, FIG. 2.

The decoder circuit shown in FIG. 2 receives image data with a resolution of 720x480 or 720x576 pixels. *Id.*, ¶3. Oku decodes the image data and saves it in memory. *Id.*, ¶¶5, 17. A display circuit later reads out the image data and overlays OSD bitmap data from memory. *Id.*, ¶¶18, 20. In the embodiment of FIG. 1,

compressed OSD data is provided as input and is directly sent to the OSD write circuit 6, which writes the compressed OSD bitmap data into the memory 13. *Id.*, ¶21.

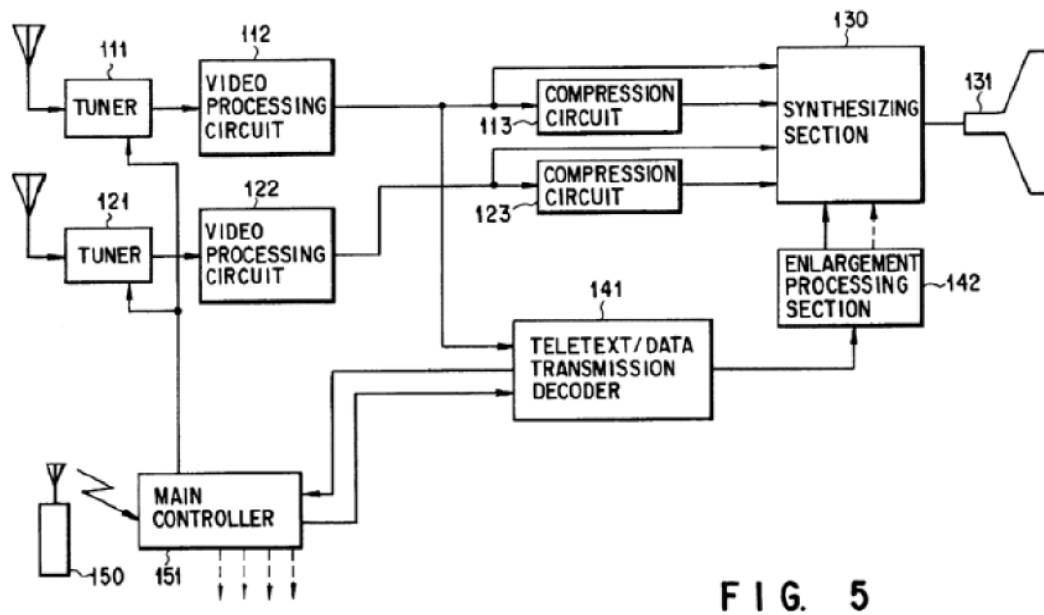
In embodiment of FIG. 2, uncompressed OSD bitmap data is received as input and OSD data compression circuit 15 is provided to compress the OSD bitmap data prior to storage in memory 13. *Id.*, ¶23.

The embodiments of both FIG. 1 and FIG. 2 decompress the OSD bitmap data read out from memory 13 by using OSD data decompression circuit 14. *Id.*, ¶22; Ex. 1007, ¶¶79-81. One of Oku's compression techniques is run-length encoding. Ex. 1004, ¶¶ 25-26.

C. Abe

Abe discloses a television displaying text and graphics data transmitted in a television signal using exemplary standard television resolutions: NTSC ("National Television Standard Committee"), used for analog television in the United States with a width/height ratio of 4:3, and EDTV ("Enhanced Definition Television"), an improved resolution standard with a width/height aspect ratio of 16:9. Ex. 1005, 2:16-24; Ex. 1007, ¶83.

An embodiment is shown in FIG. 5:



Ex. 1005, FIG. 5.

The teletext signal includes character data, *i.e.*, text data, and program data which can include “a sequence of characters” and “images” for display. *Id.*, 1:14-20; 5:38-46. Received character data is converted into display data and stored in “display memory 32.” *Id.*, 7:64-66; Ex. 1007, ¶¶82-87. Teletext/data transmission decoder 141 can also include “graphics.” Ex. 1005, 8:13-15, 9:36-39. The components of decoder 141 are shown in FIG. 4:

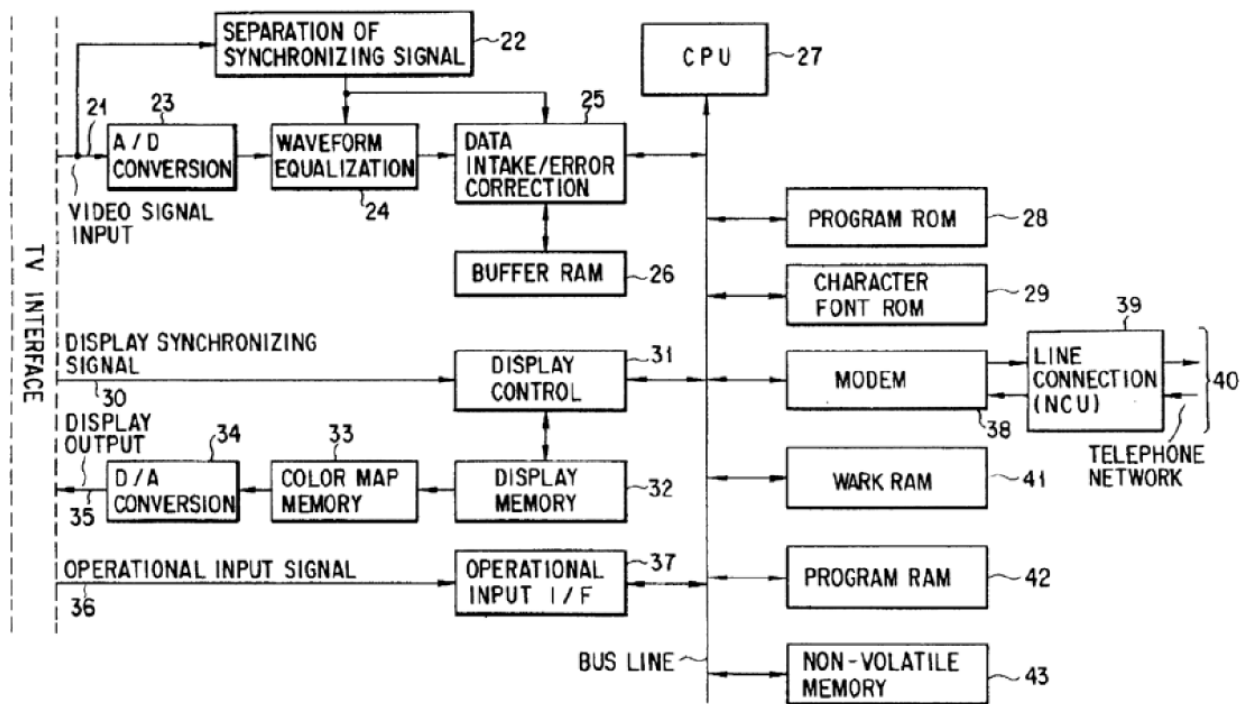


FIG. 4

Ex. 1005, FIG. 4.

Enlargement section 142 (FIG. 5) can enlarge or reduce (i.e., *scale*) the text and graphics bitmap data in display memory 32 *at will*. Ex. 1005, 9:59-65. The scaled bitmap is mixed with the image data in synthesizing section 130, shown in FIG. 5, above. *Id.*, FIG. 5; 7:26-29; 8:12-14; Ex. 1007, ¶¶82-87.

VI. DETAILED GROUNDS OF UNPATENTABILITY

Below is an explanation of each proposed ground of unpatentability in accordance with 37 C.F.R. § 42.104(b) as well as an identification of the specific portions of the evidence that supports each ground.

A. Ground 1: Claims 1-3 and 5-17, 19-21, and 23 of the '452 patent Would Have Been Obvious in View of the Combination of Mitani and Oku

Mitani modified in view of Oku renders the Challenged Claims obvious.

1. Independent Claim 1

A. [1.a]: “A digital television having a display, comprising:”

The preamble is not limiting because it “merely identifies an intended use” for the claimed invention. *Arctic Cat Inc. v. GEP Power Prods., Inc.*, 919 F.3d 1320, 1328 (Fed. Cir. 2019). Here, the “digital television” is an intended use and the claims are structurally complete without reference to the digital television.

Oku discloses a “television receiver” receiving digital signals and generating an output for “display.” Ex. 1005, ¶¶3, 5, 10, 24. A POSITA would understand Oku’s television receiver discloses a “digital television” because it decodes and processes digital signals for display. Ex. 1007, ¶¶119-121.

B. [1.b]: “a receiving part configured to receive at least one of digital image data and analog image data;”

Oku’s “parser / variable length decoding circuit 2” receives encoded video, such as MPEG video. Ex. 1004, ¶¶ 3-6. Oku’s decoding circuit 2 meets this limitation. *Id.*, ¶14; Ex. 1007, ¶122.

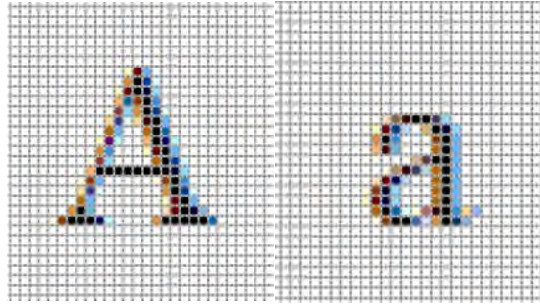
C. [1.c]: “a data processing part configured to execute bit map conversion and format-conversion for text data to be displayed on the display;”

Mitani discloses a “CPU 2” that generates bitmaps for text character codes received in a broadcast signal and converts into bitmap format for display. Ex. 1003, 26:37-27:10. The CPU performs bitmap conversion when it receives a teletext character code and converts it into a “dot pattern,” or bitmap, in “single character processing” step 34 of FIG. 27. The CPU performs format conversion when it performs “½-format image display” step 42 to adjust the bitmap for display on a display having widescreen resolution. Ex. 1007, ¶123.

i. “configured to execute bit map conversion ... for text data to be displayed on the display”

Mitani’s CPU converts teletext characters to bitmaps. Step 34 in Mitani FIG. 27 is “single character processing” which receives a character code, determines the corresponding “dot pattern,” or patterns of dots, and copies that dot pattern into image memory. Ex. 1003, 26:45; Ex. 1007, ¶124-126.

A POSITA would appreciate that writing character font data to an image memory corresponds to “bitmap conversion” in the ’452 patent. Mitani explains that “character codes are transferred to the CG-ROM reading control portion 19 whereby dot patterns ... are outputted.” Ex. 1003, 21:58-22:1. The CG-ROM is used to convert character codes into their corresponding patterns of dots, or a bitmap, such as those described earlier:



Ex. 1007, ¶¶24, 25, 31 (exemplary bitmap “dot patterns”).

“Single character processing” discloses “bitmap conversion” because it converts a character code input into bitmap data. *Id.*, ¶124-126.

ii. “configured to execute ... format-conversion for text data to be displayed on the display”

Mitani discloses format conversion by CPU 2 when the size of the bitmap in image memory is adjusted based on the resolution of the display. Mitani reads out the bitmap in image memory and reduces the height by a factor of 1/2 in order to preserve the correct display. Ex. 1003, 26:22-27, 26:34-37, 26:53-55. Specifically, when the character font data for the screen is ready to display in a widescreen mode (“mode A” in FIGS. 27 and 35), then the character is displayed in a “½-format”, *i.e.*, is reduced in size by multiplying the vertical direction by a factor of one half (“½-format image display,” FIG. 27, step 42). *Id.*, 26:53-55.

A POSITA would understand Mitani’s “½-format image display” is “format conversion” as disclosed in the context of the ’452 patent. Ex. 1007, ¶¶127-134.

For example, different scaling factors are provided in Table 1:

Display Resolution	First Bit Map Data (720 × 480, $H \times 1:V \times 1$)	Second Bit Map Data (960 × 540)
1920 × 1080	1920 × 1080 $(H \times 2.67:V \times 2.25)$	1920 × 1080 $(H \times 2:V \times 2)$
1280 × 720	1280 × 720 $(H \times 1.78:V \times 1.5)$	1280 × 720 $(H \times 2:V \times 2)$
854 × 480	854 × 480 $(H \times 1.19:V \times 1)$	854 × 480 $(H \times 0.89:V \times 0.89)$
720 × 480	720 × 480 $(H \times 1:V \times 1)$	720 × 480 $(H \times 0.75:V \times 0.89)$

Ex. 1001, 7:55-66 (annotated).

Table 1 shows multiplication factors for bitmaps in a “H” (horizontal) and “V” (vertical) dimension. Ex. 1001, 7:49-8:28; 8:54-61. Table 1 shows scaling first bit map data in only a single dimension. When scaling to 854 x 480, H is multiplied by 1.19 and V is unchanged.

A POSITA would recognize that Mitani's “½-format” mode is a real-number integration of the height or width of the bitmap. Ex. 1007, ¶127-134. Mitani converts the bitmap into a vertically smaller bitmap by leaving the width unchanged while multiplying the height by a factor of one half, or 0.50. *Id.* “Format conversion” in the ’452 patent includes multiplying a height dimension by a number less than one, the same as Mitani. *Id.*

Mitani’s “½-format” mode is used to adapt the size of bitmap data when a television is in widescreen mode to ensure that the bitmap text is all viewable. *Id.*

¶¶132-134. Accordingly, it modifies the size of the bitmap data for display, based on the display resolution. *Id.*

D. [1.d]: “a memory configured to store the bit map data obtained according to the bit map conversion in the data processing part and image data inputted from an arbitrary receiving part;”

Mitani discloses storing bitmap data in an “image memory” prior to format conversion. Ex. 1003, 26:45-46 (“A character is decoded and the character font data is written into an image memory but it is not displayed.”). The dot pattern stored in “image memory” corresponds to “bitmap data obtained according to the bit map conversion.” Ex. 1001, claim 1; Ex. 1007, ¶¶135-139. While Mitani does not specifically identify which memory is the “image memory,” the only writeable memory in Mitani is memory 7. Ex. 1003, FIG. 29, 20:35-37; 21:10-11; Ex. 1007, ¶¶135-139. A POSITA would understand that the “image memory” is part of memory 7 because there is no other writeable memory in Mitani. *Id.*

It would have been obvious to a POSITA to modify Mitani to incorporate the digital decoder taught in Oku. *Id.* Oku discloses “universal memory 13” storing the received digital video stream. Ex. 1004, ¶7, FIG. 1, FIG. 2. Oku stores both received image data and received text and graphics (which Oku calls “on-screen display” or “OSD” data) in memory 13. *Id.*, ¶¶14, 21, 23 (“OSD bitmap data are stored in the memory 13 in a compressed data format”; “OSD data are received in

the form of a bitmap... compressed... and written in the memory 13”). Oku also discloses storing the decoded image data back in memory 13. Ex. 1004, ¶17. Oku discloses both encoded and decoded image data stored in memory 13, meeting this limitation. Ex. 1007, ¶138.

E. [1.e]: “an image outputting part configured to read image data from the memory; and”

Mitani combined with Oku discloses this limitation. Oku discloses that encoded image data is stored in memory for display as discussed for limitation (1.d), *supra*. The image data is read by “display data readout control circuit 11” so that the image data can be displayed. Ex. 1004, ¶18, FIG. 1. Oku’s display data readout control circuit 11 corresponds to this limitation because it reads out the image data for display, Ex. 1007, ¶140.

F. 1[f]: “a display processing part configured to mix image data read from the image outputting part and the bit map data converted in format by the data processing part.”

Oku discloses display circuit 5 that mixes image data for display with OSD data. Ex. 1007, ¶¶141-145. The OSD bitmap data is read from memory 13 and then provided to display circuit 5 which “overlays” the bitmap data on image data: Ex. 1004, ¶¶18-22, FIG. 1.

A POSITA would understand Oku’s “overlay” discloses “mixing” as referred to in the ’452 patent because both combine image data with text data for

simultaneous display on a screen. Ex. 1007, ¶¶141-145; Ex. 1004, ¶22 (“restored OSD data are supplied to the display circuit 5 ... and are displayed as an overlay on the decoded image data.”) Ex. 1001, 6:60-7:2 (“the image and text are simultaneously outputted”). The ’452 patent omits details of the claimed “mixing.” Ex. 1001, 7:3-6 (“mixing the image data and the bit map data ... is well known, and an explanation of it will be excluded...”). A POSITA would understand that the “overlay” process in Oku is among the “well known” ways of “mix[ing] image data read from the image outputting part and the bit map data.” Ex. 1007, ¶¶141-145.

g. Motivation to Combine

A POSITA would have been motivated to combine Mitani with Oku as both are in the television art for mixing bitmap graphics with television image data. Ex. 1007, ¶¶99-118. Mitani discloses a circuit for converting the format of teletext data mixed with video in widescreen resolution. *Id.* Oku discloses improved display of text on digital video that reduces memory use. *Id.* Two main principles that would have motivated a POSITA were the superior quality available from digital technology and the pending obsolescence of analog broadcast by order of the FCC in the United States. *Id.* The termination of analog broadcast by order of the FCC would serve as an explicit teaching, suggestion, or motivation to alter analog television references, such as Mitani, to support digital television

processing, as in Oku. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 419-20 (2007) (obviousness may be found when a teaching, suggestion, or motivation is present in the prior art). Ex. 1007, ¶¶99-118. The FCC in 1997 issued a mandate that analog television broadcast would be terminated by December 31, 2006. *See* Ex. 1010.

A POSITA would also combine Mitani with Oku to enable the television in Mitani to display higher quality digital images instead of analog video signals. Ex. 1007, ¶¶99-118. At the time of the '452 patent, the shift to digital video was well underway, as the patent acknowledges. Ex. 1001, 1:21-23, 28-32. A POSITA would recognize market forces prompting the adoption of digital video processing, as in Oku, in other television devices, such as in Mitani. *KSR*, 550 U.S. at 417 (“When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it ... in the same field.”). Modifying Mitani to support digital signal processing in view of Oku would have been incentivized by market forces. Ex. 1007, ¶¶99-118.

The combination of Mitani with Oku is a simple substitution of one known component--analog image processing in Mitani--with another, digital image processing in Oku, to yield the predictable result. *KSR*, 550 U.S. at 416 (“the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result”).

Moreover, this combination would have been obvious to try, as market forces would encourage updating known text-processing techniques to work with modern digital televisions. *KSR*, 550 U.S. at 421 (“the fact that a combination was obvious to try might show that it was obvious under § 103”); Ex. 1007, ¶¶99-118.

h. Reasonable Expectation of Success

A POSITA would have had a reasonable expectation of success in combining Mitani and Oku as both are directed to circuitry for receiving and processing video signals with embedded text information. Mitani improves a conventional analog television decoder and Oku improves a conventional digital television decoder. A POSITA would replace the analog decoder in Mitani with a digital decoder circuit as in Oku, a modification well within the capabilities of a POSITA. Ex. 1007, ¶¶105,116-118. The digital decoder circuit requires a memory to store image data, which Mitani has in memory 7. *Id.* Oku expressly states that its “universal memory” stores both received image data and graphics (OSD) data. Ex. 1004, Abstract; ¶18 (“ [t]he OSD data readout circuit 12 overlays OSD data read from the memory 13 and outputs it as image data.”). A POSITA would recognize no meaningful difference between text and graphic “OSD data” in Oku and text and graphic “teletext data” in Mitani. Storing digital image data in a memory was known in the prior art, as acknowledged by Oku and the AAPA. *See also* Ex. 1001, 2:23-28.

Accordingly, a POSITA would have recognized that Mitani's memory storing bitmap data could be used to accommodate Oku's storage of image data without altering any predictable use of the memory or other unexpected results. Ex. 1007, ¶110. The combination would merely have led a POSITA to combine Mitani's memory storing bitmap data and Oku's memory storing image data to arrive at "a memory configured to store the bit map data ... and image data." *Id.*

2. **Claim 2: "The digital television as defined in claim 1, wherein the data processing part comprises a bitmap converter configured to determine whether the text data is the bit map data and that converts the text data into the bit map data, based upon the determined result and a bit map compressor configured to compress the bit map data by using compression coding."**

Oku discloses receiving OSD as bitmap data. Ex. 1004, ¶23. Mitani discloses receiving text data as character codes and converting the codes into bitmap data. Ex. 1003, 26:45 ("A character is decoded and the character font data is written into an image memory but it is not displayed."). Conversion occurs only when a code is a character code, and other data are not converted. Ex. 1007, ¶¶146-152; Ex. 1003, 26:38-40. Both Mitani and Oku store in memory text (OSD) data as bitmap data. Oku discloses storing OSD bitmap data "in the memory 13 in a compressed data format." Ex. 1004, ¶21. Oku discloses that OSD data are "received ... from the outside" and compressed prior to storing in memory. *Id.*, ¶23

(“OSD data are received in the form of a bitmap from the outside, and the data are compressed by the OSD data compression circuit 15 and written in the memory 13 via the OSD data writeout circuit 6.”). The FIG. 2 embodiment of Oku compresses bitmaps received from the outside prior to storing in memory. *Id.*

The combination of Oku and Mitani informs a POSITA that the text (OSD) data can be received as either character codes, which are converted into bitmap data, compressed, and stored in memory, or bitmap data to be compressed and stored in the memory. Claim 2 would have been obvious from the combined teachings of Mitani and Oku. Ex. 1007, ¶¶146-152.

A. Motivation to Combine

Oku expressly teaches using compression to allow storage of both bitmap data and image data in the same memory. Ex. 1004, ¶¶8-9. Oku identified the problem that “general-purpose memory” in decoders is often too small to store both image data and bitmap data. Ex. 1004, ¶¶8-9. Oku expressly teaches using compression to allow storing both image data and bitmap data in limited memory. *KSR*, 550 U.S. at 419-20. A POSITA would have recognized that Mitani’s memory is likely insufficient to store both bitmap data (as Mitani requires) and image data (as Oku requires). The POSITA would have been motivated to incorporate the compressor and decompressor circuits in Oku to improve Mitani by reducing the

memory required, which reduces cost and increases marketability of the device.

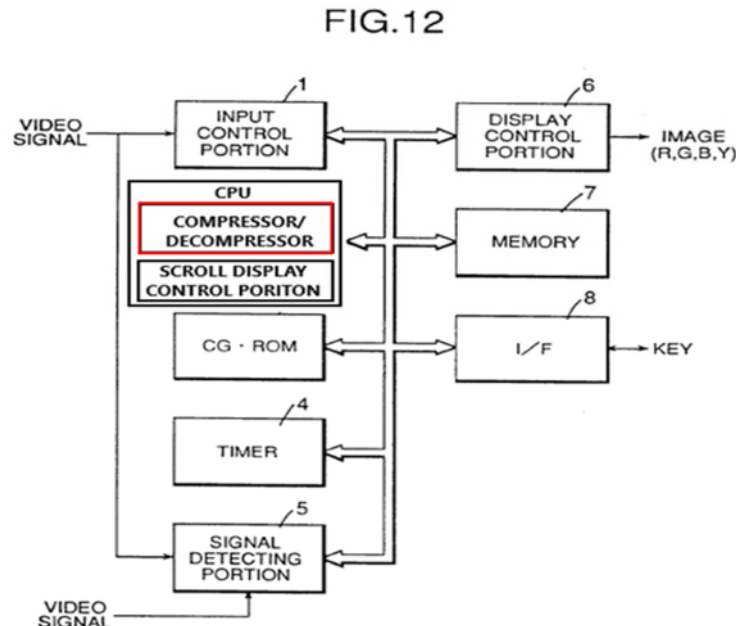
Ex. 1007, ¶¶110-114.

Oku's compressor was an obvious modification in the same field of endeavor motivated by design incentives and market forces. *KSR*, 550 U.S. at 417. A POSITA would recognize using less memory is commercially advantageous. Ex. 1007, ¶¶110-114. Oku suggests that adding a compressor is preferable to adding more memory, which may be more complex or expensive than using a compressor. *Id.*; Ex. 1004, ¶¶7-9.

A POSITA would have recognized that the use of Oku's compression and decompression would be an obvious design choice. Ex. 1007, ¶¶110-114. Skilled artisans were aware that systems like Mitani and Oku frequently involve a tradeoff between computational intensity and memory use. *Id.* Compression reduces the amount of memory needed but requires more processing. A POSITA would recognize that the combination of Mitani with Oku to process digital signals could be designed either to use more memory, increasing its cost, or to use compression, increasing computational burden. *Id.* A POSITA would be motivated to choose Oku's compression to utilize available computational resources without adding memory. *Id.*

B. Reasonable Expectations of Success

A POSITA would have had a reasonable expectation of success in combining the compressor and decompressor circuit of Oku with the processing in Mitani. Ex. 1007, ¶¶115-118. The combination of Mitani and Oku uses the digital processing in Oku, which includes the compressor and decompressor. *Id.* The Oku compressor and decompressor circuits would have been straightforward for a POSITA to add to the Mitani memory bus between the CPU and memory:



Ex. 1004, FIG. 12 (annotated to add a compressor/decompressor in the CPU); Ex. 1007, ¶¶117-118.

A POSITA would have been able to incorporate the compressor/decompressor in Oku in an interface between CPU 2 and memory 7 in Mitani so that when bitmap data is

written into memory 7 it would be compressed. The combination would have been within the capabilities of a POSITA. Ex. 1007, ¶¶110-118.

3. **Claim 3: “The digital television as defined in claim 2, wherein the data processing part further comprises a bit map decompressor configured to read the compressed bit map data from the memory to thereby restore the read data to its original bit map data and a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution.”**

These limitations are obvious in view of Mitani and Oku. Oku discloses OSD data decompression circuit 14 which reads compressed bitmap data from memory and decompresses it to restore the “original bitmap.” Ex. 1004, ¶¶21-22. Because the POSITA would have been motivated to compress bitmap data being stored in memory, as explained for claim 2, the POSITA would have recognized the need to decompress, *i.e.*, restore, that bitmap data when it is read for display, as taught by Oku. *Id.*; Ex. 1007, ¶¶153-155.

Moreover, a POSITA would have understood that the format conversion of Mitani must be applied to uncompressed bitmap data because the bitmap data in Mitani is uncompressed, and moreover it was understood in the art at the time to apply bitmap scaling to uncompressed data rather than compressed data. *Id.*, ¶¶153-155. A POSITA would have been motivated to combine Mitani and Oku, with a reasonable expectation of success, for the reasons described for claim 2.

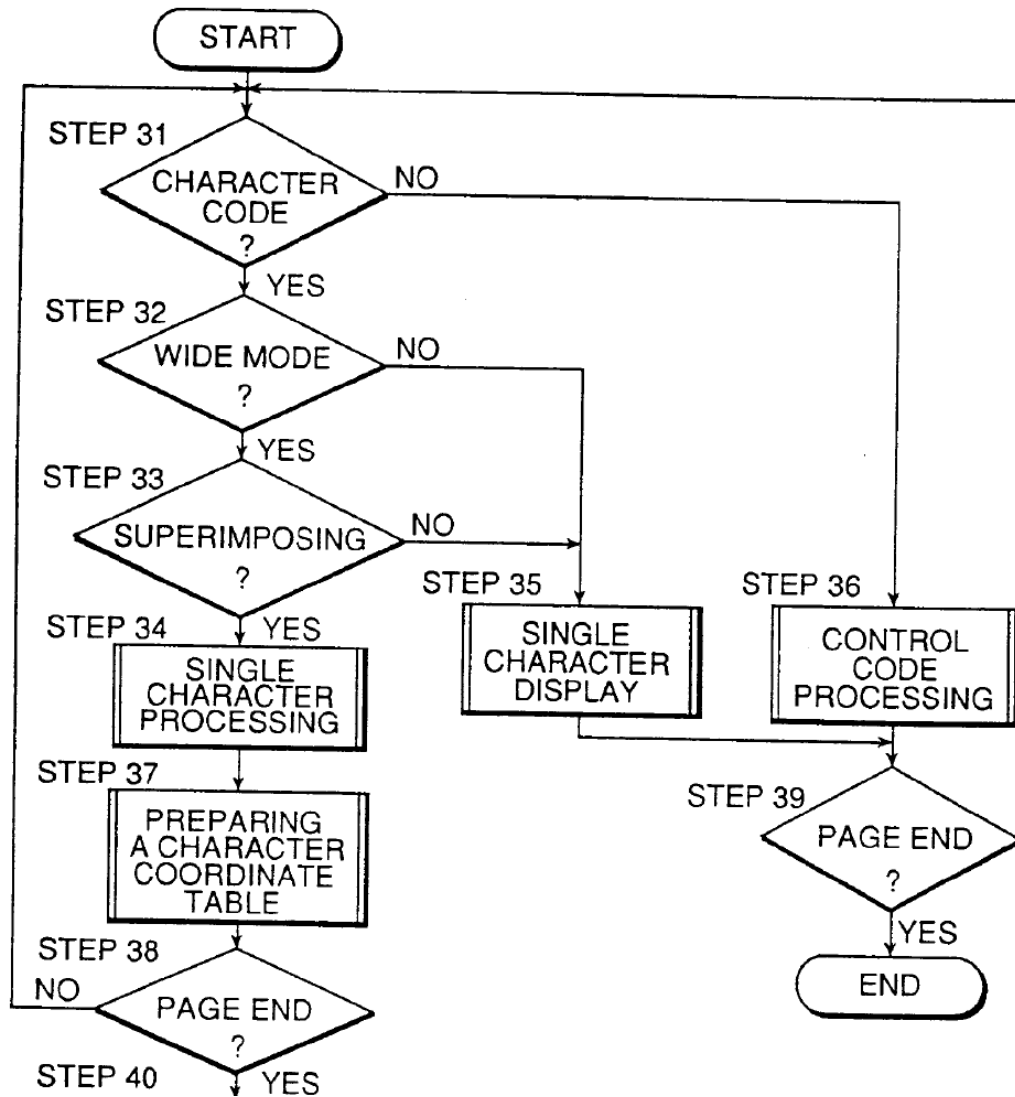
Mitani discloses format conversion depending on screen resolution for the reasons stated in limitation 1.c, *supra*. A POSITA would have understood that Mitani converts the format of uncompressed bitmap data because the format conversion in Mitani necessarily uses uncompressed bitmap data. Ex. 1007, ¶¶153-155. A POSITA would have understood that in the “ $\frac{1}{2}$ -format” display of Mitani “dots ... are distributed one by one ... so that an image is reduced vertically by a factor of 2.” Ex. 1003, 26:54-55. Format conversion as taught by Mitani would be applied after the text bitmap data has been decompressed and before display. Ex. 1007, ¶¶153-155.

4. **Claim 5: “The digital television as defined in claim 2, wherein the bit map converter converts the text data into the bit map data, if it is determined that the text data is not the bit map data.”**

These additional limitations would have been obvious. Mitani discloses that when text data is not already bit map data, the text data is converted into bit map data by doing single character text processing. Ex. 1003, 26:38-45. Ex. 1007 at ¶¶156-158.

This is verified in FIG. 27.

FIG.27



Ex. 1003, FIG. 27 (partial).

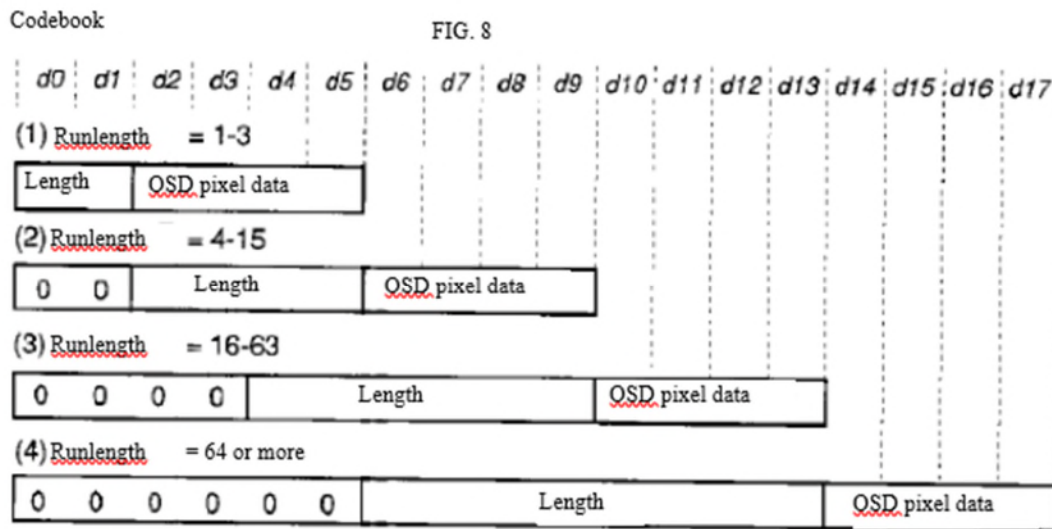
At STEP 31 the input data is checked to see if it is a character code. A determination that it is a character code is a determination that it is not a bit map. A character code is converted into a bitmap in STEP 34. *Id.*, 26:37-48; Ex. 1007, ¶¶156-158.

5. **Claim 6: “The digital television as defined in claim 2, wherein the bit map converter bypasses the text data, if it is determined that the text data is the bit map data.”**

It would have been obvious to a POSITA that the bitmap converter in the combination of Mitani and Oku would bypass text data if the text data were already bitmap data. Oku discloses receiving bitmap data and not converting it before compression and storage in memory. Ex. 1004,, ¶ [0028] (“OSD data in the form of bitmap is received and temporarily stored in a buffer inside the OSD data compression circuit 15.”). Bitmaps that are received do not need to be bitmap converted because they are already in the appropriate format for mixing. A POSITA would understand that Oku does not bitmap convert text data that is received as bitmap data, because Oku does not identify any such conversion and such conversion is not necessary. Ex. 1007, ¶159.

6. **Claim 7: “The digital television as defined in claim 2, wherein the predetermined compression coding is a run-length compression coding.”**

The additional limitations of claim 7 would have been obvious because Oku discloses run-length compression coding as predetermined compression coding. Ex. 1004, ¶ [0025] (“FIG. 8 shows a codebook used for the compression of OSD data. OSD data per pixel are 4bit to make the number of colors 16 colors; this codebook is applied when performing run length compression.”); Ex. 1007, ¶¶160-162.



Ex. 1004, FIG. 8.

7. **Claim 8: “The digital television as defined in claim 1, wherein the text data is at least one among HTML data, DHTML data, XML data, SGML data and bit map data.”**

Oku teaches this limitation. Oku discloses receiving text data as OSD data.

Ex. 1004, ¶8. This OSD data is received as a bitmap. *Id.*, ¶23; Ex. 1007, ¶163.

8. **Claim 9: “The digital television as defined in claim 1, wherein the memory stores first bit map data or second bit map data.”**

Mitani teaches this limitation. The conjunction “or” is met by satisfying either or both of the first and second conditions, therefore “storing” only one of the “first bit map data” and “second bit map data” meets this limitation. *Id.*, ¶¶164-167. A POSITA would understand that claim 9 does require any particular resolution for the first or second bitmap data. Mitani discloses that “[a] character is

decoded and the character font data is written into an image memory but it is not displayed.” Ex. 1003, 26:45, 26:21-27:16. A POSITA would have understood that decoded character font data is stored in memory as a bitmap. Ex. 1007, ¶¶164-167.

9. **Claim 10: “The digital television as defined in claim 1, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data.”**

The limitations are met by the combination of Mitani and Oku for the reasons stated for claim 3. *Id.*, ¶¶168-169.

10. **Claim 11: “The digital television as defined in claim 1, wherein the display displays different resolution images.”**

The display in Mitani displays “different resolution images” as those terms are used in the ‘452 patent. For example, Mitani describes displaying according to the television system NTSC. Ex. 1003, 26:22-24. Mitani also discloses a widescreen television display that displays in a different resolution. *Id.*, 26:24-27. Mitani also describes adjustment from normal aspect ratio to widescreen aspect ratio:

In this case, the TV/teletext display control portion 57 selects the television program receiving mode and transmits the processed data to the display device. In case of viewing an ordinary television program on a wide-aspect screen of a TV receiver set, a user is required only to control the display mode control portion 12 through a remote control to select a wide-screen image.

Ex. 1003, 21:42-46.

Mitani further discusses that the remote control may be used to adjust the television display screen to display different resolution images. *Id.*, 21:7-8; 24:22-24; Ex. 1007, ¶¶ 172-177.

A POSITA would understand that televisions that support widescreen display aspects support both normal and widescreen aspect ratio displays because not every signal is a widescreen aspect signal. Wide screen and normal aspect ratios are “different resolutions” because each renders a display image into a different size of viewable area. That is, Mitani’s widescreen capable display can also display a normal aspect ratio signal at a normal aspect ratio without resizing overlaid teletext data and a normal aspect ratio signal or a widescreen signal at a widescreen aspect ratio with resizing of overlaid text data. A POSITA would understand that the resolutions are “different.” Ex. 1003, 26:25 (“wide television receiver which may change the width and height of its screen image”); FIG. 25; *Id.*, 10:4; and FIG. 25B and FIG. 25C illustrating the display of different resolution images. *Id.*, 26:5-8; Ex. 1007, ¶¶ 172-177.

11. Independent Claim 12

Claim 12 is essentially the same in relevant part as claim 1 regarding bitmap conversion and format conversion limitations and to claims 2 and 3 regarding the compressor and decompressor limitations. Ex. 1007, ¶178.

A. Preamble-[12.a]: “A digital television having a data processing device and a display, comprising:”

To the extent the preamble is limiting, Mitani and Oku disclose a digital television for the reasons set forth for limitation 1.a, *supra*, and a data processing device for the reasons stated for limitation 1.c, *supra*.

B. [12.b]: “a bit map converter configured to determine whether text data to be displayed on the display is bit map data and to convert the text data to bit map data;”

Mitani discloses a bit map converter for the reasons stated for limitation 1.c and claim 2.

C. [12.c]: “a bit map compressor configured to compress the bit map data by using compression coding;”

This limitation is obvious for the reasons stated for claim 2.

D. [12.d]: “a bit map decompressor configured to read the compressed bit map data from a memory for restoring read data to its original bit map data; and”

This limitation is obvious for the reasons stated for claim 3.

E. [12.e]: “a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution.”

This limitation is obvious for the reasons stated for limitation 1.c and claim 3.

12. **Claim 13: “The digital television as defined in claim 12, wherein the text data is at least one among HTML data, DHTML data, XML data, SGML data and bit map data.”**

Claim 13 is obvious for the reasons stated for claim 8. Ex. 1007, ¶¶163, 179.

13. **Claim 14: “The digital television as defined in claim 12, wherein the bit map converter converts the text data into bit map data if it is determined that the text data is not bit map data.”**

Claim 14 is obvious for the reasons stated for claim 5. *Id.*, ¶¶156-158, 180.

14. **Claim 15: “The digital television as defined in claim 12, wherein the bit map converter bypasses the text data if it is determined that the text data is bit map data.”**

Claim 15 is obvious for the reasons stated for claim 6. *Id.*, ¶¶159, 181.

15. **Claim 16: “The digital television as defined in claim 12, wherein the predetermined compression coding is a run-length compression coding.”**

Claim 16 is obvious for the reasons stated for claim 7. *Id.*, ¶¶160-162, 182.

16. **Claim 17: “The digital television as defined in claim 12, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data previously stored in the memory.”**

Claim 17 is obvious for the reasons stated for claims 9 and 10. Also, Mitani discloses bitmap data previously stored in memory, *i.e.*, stored in memory prior to performing bitmap conversion, in font generated read-only memory (CG-ROM) 3 which contains bitmaps of fonts used for text data conversion and present in memory prior to bitmap conversion. Ex. 1003, 20:22-23; Ex. 1007, ¶¶164-169-171.

17. **Claim 19: “The digital television as defined in claim 12, wherein the display displays different resolution images.”**

Claim 19 is obvious for the reasons discussed for claim 11. *Id.*, ¶¶172-177.

18. **Independent Claim 20**

- A. **[20.a]: “A digital television having a data processing device and a display, comprising:”**

Claim 20 differs little from claim 12. It recites the same limitations in a different order, but without any substantive change in the requirements of the claim. *Id.* ¶¶183-184. This limitation is obvious for the reasons stated for claim 12, limitation [12.a]..

- B. **[20.b]: “a bit map converter configured to determine whether text data to be displayed on the display is bit map data and configured to convert the text data into bit map data;”**

Mitani discloses a bit map converter for the reasons stated for limitation 1.c and claim 2.

- C. **[20.c]: “a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution;”**

This limitation is obvious for the reasons stated for limitation 1.c and claim 3.

- D. **[20.d]: “a bit map compressor configured to compress the bit map data by using compression coding; and”**

This limitation is obvious for the reasons stated for claim 2.

- E. **[20.e]: “a bit map decompressor configured to read the compressed bit map data from a memory for restoring read data back to its original bit map data.”**

This limitation is obvious for the reasons stated for claim 3.

19. **Claim 21: “The digital television as defined in claim 20, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data previously stored in the memory.”**

Claim 21 is obvious for the reasons stated for claims 9 and 10. Ex. 1007,

¶¶164-171.

20. **Claim 23: “The digital television as defined in claim 20, wherein the display displays different resolution images.”**

This claim is obvious in view of Mitani and Oku for the reasons stated for claim 11. *Id.* ¶¶172-177.

B. Ground 2: Claims 1 and 8-11 of the '452 Patent Would Have Been Obvious in View of Abe and the AAPA

The AAPA discloses a digital television having all the limitations of claims 1 and 8-11 except for the “format conversion” element. Abe discloses format conversion in an analog television because it discloses resizing bitmap text data for display. The combination of the AAPA and Abe therefore renders the claims challenged in this Ground obvious. Ex. 1007, §§185-195.

Combining AAPA with Abe is permitted under the Updated Guidance on the Treatment of Statements of the Applicant in the Challenged Patent in *Inter Partes* Reviews under 35 U.S.C. §311, June 9, 2022. Ex. 1014. The Guidance states “If

an IPR petition relies on admissions in combination with reliance on one or more prior art patents or printed publications, those admissions do not form "the basis" of the ground and must be considered by the Board in its patentability analysis." Ex. 1014, 4 (citing *Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1377 (Fed. Cir. 2022)).

1. Independent Claim 1

a. [1.a]: "A digital television having a display, comprising:"

If the preamble is limiting, the AAPA discloses a digital television. Ex. 1001, 2:12-3:38; Ex. 1007, ¶196.

B. [1.b]: "a receiving part configured to receive at least one of digital image data and analog image data;"

This limitation is disclosed by either analog image data or digital image data. The AAPA discloses receiving both types of image data. Ex. 1001, 2:23-28, 2:46-47; Ex. 1007, ¶197.

C. [1.c]: "a data processing part configured to execute bit map conversion and format-conversion for text data to be displayed on the display;"

Abe discloses a "teletext/data transmission decoder 141," which performs bitmap conversion, and an "enlargement processing section 142," which performs format conversion. Together these disclose the claimed "data processing part." *Id.*, ¶¶198-203.

Teletext/data transmission decoder 141 receives text data as “a sequence of characters.” Ex. 1005, 1:14-20; 5:38-46. Received character data is converted into display data, *i.e.*, a bitmap, and stored in “display memory 32.” *Id.*, 7:64-66. A POSITA would have recognized that display data is a bitmap because it stores “image pixel data” which can be converted, *e.g.*, by enlarging or reducing. *Id.*, 9:64-10:3; Ex. 1007, ¶¶198-203.

Enlargement processing section 142 receives the output of decoder 141, which is the content of display memory 32. Ex. 1005, 8:22-25. It then performs format conversion by “dimensionally enlarg[ing] or reduc[ing]” “characters and graphics” “at will.” Ex. 1005, 9:57-65. A POSITA would have understood that Abe’s disclosure of enlarging or reducing corresponds to “format conversion.” Ex. 1005, 9:66-10:3; Ex. 1007, ¶201.

D. [1.d]: “a memory configured to store the bit map data obtained according to the bit map conversion in the data processing part and image data inputted from an arbitrary receiving part;”

The AAPA discloses storing received digital image data in memory. Ex. 1001, 2:14-17 (“As shown, the image display device is comprised of a memory 101 in which image data and text data are stored, an image outputting part 102 for reading the image data from the memory 101.”); Ex. 1007, ¶204. The text data is stored as bitmap data. Ex. 1001, 2:29-31; 2:32-36; 2:40:43.

Abe also discusses storing digital RGB, i.e., bitmaps, in color map memory

33. Ex. 1007, ¶204.

E. [1.e]: “an image outputting part configured to read image data from the memory; and”

The AAPA has an “image outputting part 102” to read the image data stored in the memory 101. Ex. 1001, 2:15-17; Ex. 1007, ¶205.

F. [1.f]: “a display processing part configured to mix image data read from the image outputting part and the bit map data converted in format by the data processing part.”

This would have been obvious over Abe in view of AAPA’s display processing part 103. Ex. 1001, 2:40-43. Like AAPA Abe discloses combining a television signal with bitmap data stored in memory and a bitmap read digitally from memory. Abe provides that (“the D/A converter 34 may be omitted and the RGB signal produced by the color map memory 33 may be directly produced as an output signal.”). Ex. 1005, 7:29-32; Ex. 1007, Ex. 1007, ¶¶195, 206-207.

Abe performs format conversion by “dimensionally enlarg[ing] or reduc[ing] ... characters and graphics ... at will.” Ex. 1005, 9:57-65. A POSITA would understand that Abe’s disclosure of enlarging or reducing corresponds to “format conversion.” *Id.*, 9:66-10:3.

g. Motivation to Combine

A POSITA would have been motivated to modify Abe to adopt emerging digital television broadcast standards. Ex. 1007, ¶¶185-195. Abe and AAPA are both in television art, and both disclose overlaying text data on image data. *Id.* Abe receives analog video, and AAPA receives digital and analog video. A POSITA would have understood that the advantages of Abe could be obtained for digital video by adding Abe's teletext circuitry to the AAPA. *Id.*

The pending obsolescence of analog video in the U.S., would have motivated a POSITA to combine Abe with digital television art like AAPA. *Id.* The prior art therefore provides an express teaching, suggestion, or motivation in the form of government regulation in favor of digital signal processing.

AAPA combined with Abe was a simple substitution of known elements - digital processing of AAPA in place of the analog processing of Abe - yielding a predictable result. The analog video processing of Abe is separate from the text processing, and the substitution of the AAPA's digital signal processing would therefore not impact the disclosed text-processing circuitry or process in Abe. Because the substitution of digital processing in place of analog processing would still have a video signal entering the system and digital display data exiting, the result would be predictable. *Id.*; *KSR*, 550 U.S. at 416.

A POSITA considering the pending obsolescence of analog signal processing would also have found it obvious to try adapting Abe to support digital television. *KSR*, 550 U.S. at 421. A POSITA would have recognized that it would have been obvious to combine Abe and AAPA to allow Abe to use digital signals as they became more prevalent. *Id.*; Ex. 1007, ¶¶185-195.

A POSITA would have been motivated to combine Abe with AAPA to enable the television in Abe to display, in addition to its analog video signal, digital video signals. *Id.* AAPA acknowledges the shift from analog to digital television. Ex. 1001, 1:21-23, 1:28-32; *Id.* As such, a POSITA would have recognized the advancements in the field and market forces prompting their adoption. *KSR*, 550 U.S. at 417 (“design incentives and other market forces can prompt variations ... in the same field.”). Modifying Abe to support digital signal processing in view of AAPA would have these incentives.

h. Reasonable Expectations of Success

A POSITA would have had a reasonable expectation of success in combining Abe with AAPA. Ex. 1007, ¶¶185-195. Both are in the field of television art, and analog and digital signal processing were well-known in the art. Both references have separate image and text data processing. *Id.* Abe’s image processing is shown in the red box below:

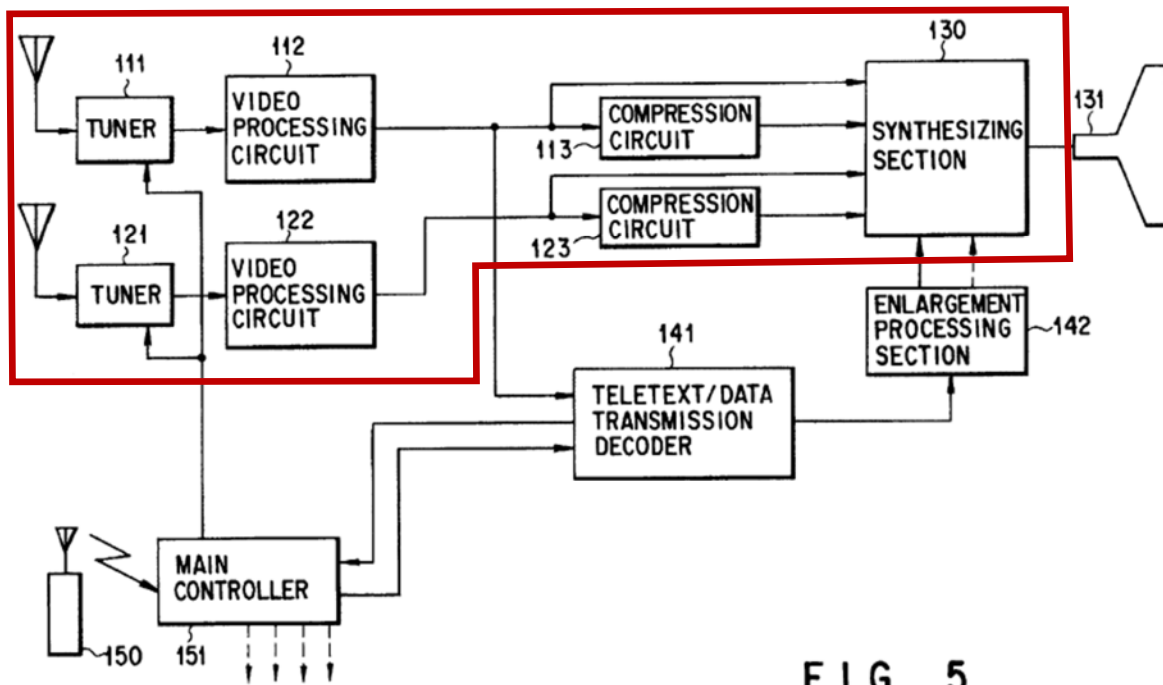


FIG. 5

Ex. 1005, FIG. 5 (annotated).

A POSITA would have recognized that replacing this analog path with the digital path of AAPA would require only conventional knowledge art to write received image data to memory, and retrieve the image data from memory using the prior art image outputting part shown in AAPA. Ex. 1007, ¶¶185-195. The analog image processing portion replaced with a digital processing portion substituted in from AAPA is illustrated as follows:

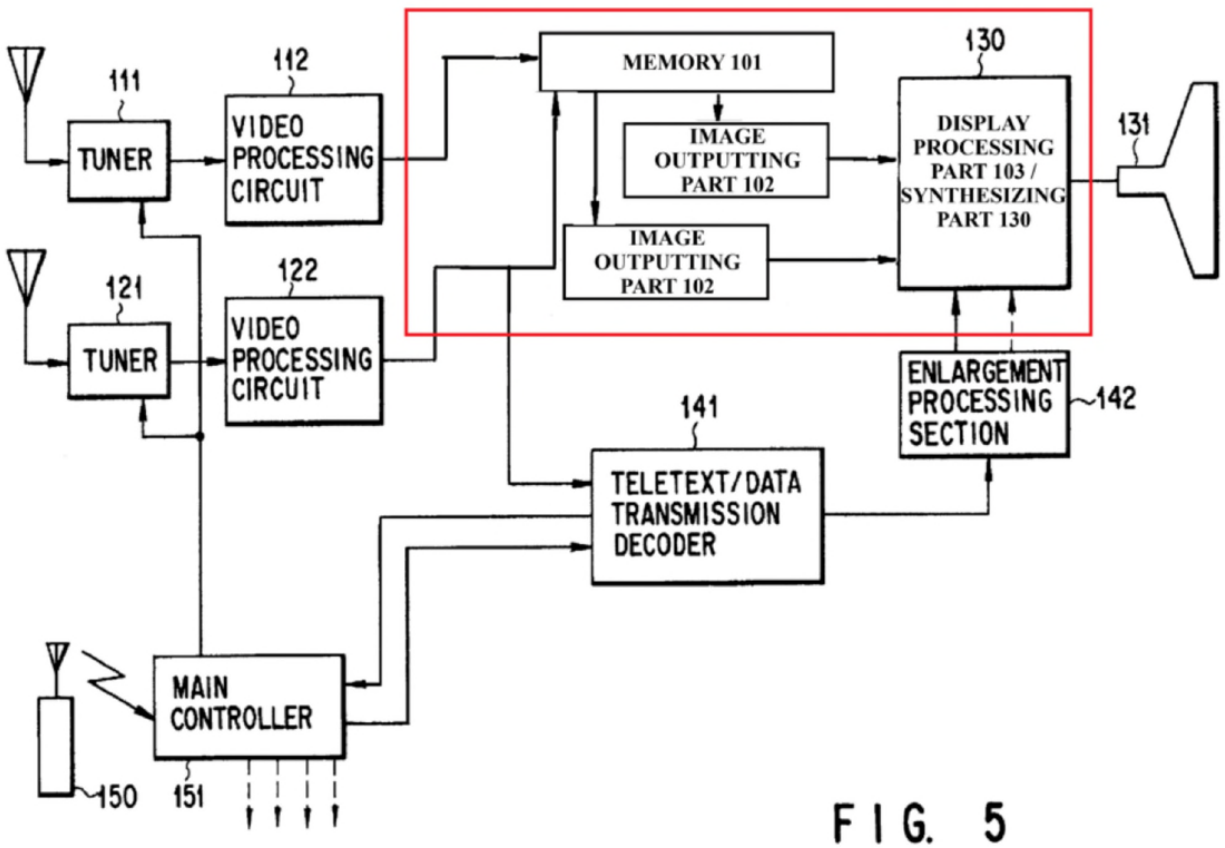


FIG. 5

Ex. 1005, FIG. 5 (modified with respect to red box portion).

The teletext processing in Abe would be expected to work as predicted, because it already retrieves digitally-encoded text from a received signal and generates a bitmap image to “synthesize,” or mix, with the output of the image processing path. *Id.* The POSITA would also have understood this replacement would simplify Abe by obviating the analog/digital converter 23 in FIG. 4 and allowing Abe to combine digital bitmap data more simply with digital image data. Ex. 1007, ¶¶185-195.

2. **Claim 8: “The digital television as defined in claim 1, wherein the text data is at least one among HTML data, DHTML data, XML data, SGML data and bit map data.”**

AAPA meets the additional limitations of claim 8 through its disclosure of receiving text data that "may" be converted to bitmap data which would not require conversion. Ex. 1001, 2:29-31, Ex. 1007, ¶212. TAAPA meets the additional limitations of claim 8 by disclosing receiving text data in a format besides bitmap data and then converting that text data to bitmap data. Ex. 1001, 2:29-31. Such data then becomes "bit map data" while still remaining "text data" (*Id.*, 2:37-43), meeting the literal scope of claim 8. Ex. 1007, ¶¶208-212.

3. **Claim 9: “The digital television as defined in claim 1, wherein the memory stores first bit map data or second bit map data.”**

Claim 9 is found in Abe’s display memory 32 storing first bitmap data or second bitmap data. Ex. 1007, ¶¶213-214. Ex. 1005, 7:4-18; 7:60-67. Abe discloses storing bitmap data generated by decoder 141 in display memory 32. Ex. 1005, 6:51-54, 7:64-67.

4. **Claim 10: “The digital television as defined in claim 1, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data.”**

Abe discloses claim 10 for the reasons stated for Ground 2, claim 9. *Id.*, ¶215.

5. **Claim 11: “The digital television as defined in claim 1, wherein the display displays different resolution images.”**

Claim 11 would have been obvious over Abe combined with AAPA, which discloses a digital television that can “display various images” having different resolutions. Ex. 1001, 2:54-58; 3:4-14; Ex. 1007, ¶¶216-217.

C. **Ground 3: Claims 2, 3, 5-7 and 12-17, 19-21 and 23 of the ’452 Patent Would Have Been Obvious Over Abe Modified in View of AAPA and Oku**

This Ground addresses claims of the ’452 patent that include a “bitmap compressor” and a “bitmap decompressor.” These components were well-known to conserve memory.

Oku discloses OSD circuit that includes a compression circuit to compress bitmap data for characters and graphics used in the OSD and discloses the “bitmap compressor” and “bitmap decompressor” used in the claims.

1. **Claim 2: “The digital television as defined in claim 1, wherein the data processing part comprises a bit map converter configured to determine whether the text data is the bit map data and that converts the text data into the bit map data, based upon the determined result, and a bit map compressor configured to compress the bit map data by using compression coding.”**

Abe in view of Oku teaches the additional limitations of claim 2.

Abe’s bitmap converter determines whether the text data is “bit map data” and converts the text data into bit map data under the control of CPU 27. Ex. 1005, 7:60-67. The conversion would necessarily include determining that inputs

correspond to characters codes intended for conversion and, therefore, must “determine whether the text data is the bit map data and that converts the text data into the bit map data, based upon the determined result.” Ex. 1007, ¶¶227-229.

Oku teaches compressing bit map data using an “OSD data compression circuit 15,” using many different available compression codings, including run-length encoding. Ex. 1004, ¶ [0026]. The combination of Abe, AAPA, and Oku would include Oku’s compression circuit because a POSITA would appreciate that including compression would allow the memory of Oku to be used more efficiently with no diminution in quality. Ex. 1007, ¶¶227-229.

a. Motivation to Combine

A POSITA would have been motivated to combine AAPA and Abe for the reasons described above in Ground 2. Ex. 1007, ¶¶218-226. It would have further been obvious to combine Abe and AAPA with Oku’s digital decoder circuitry.

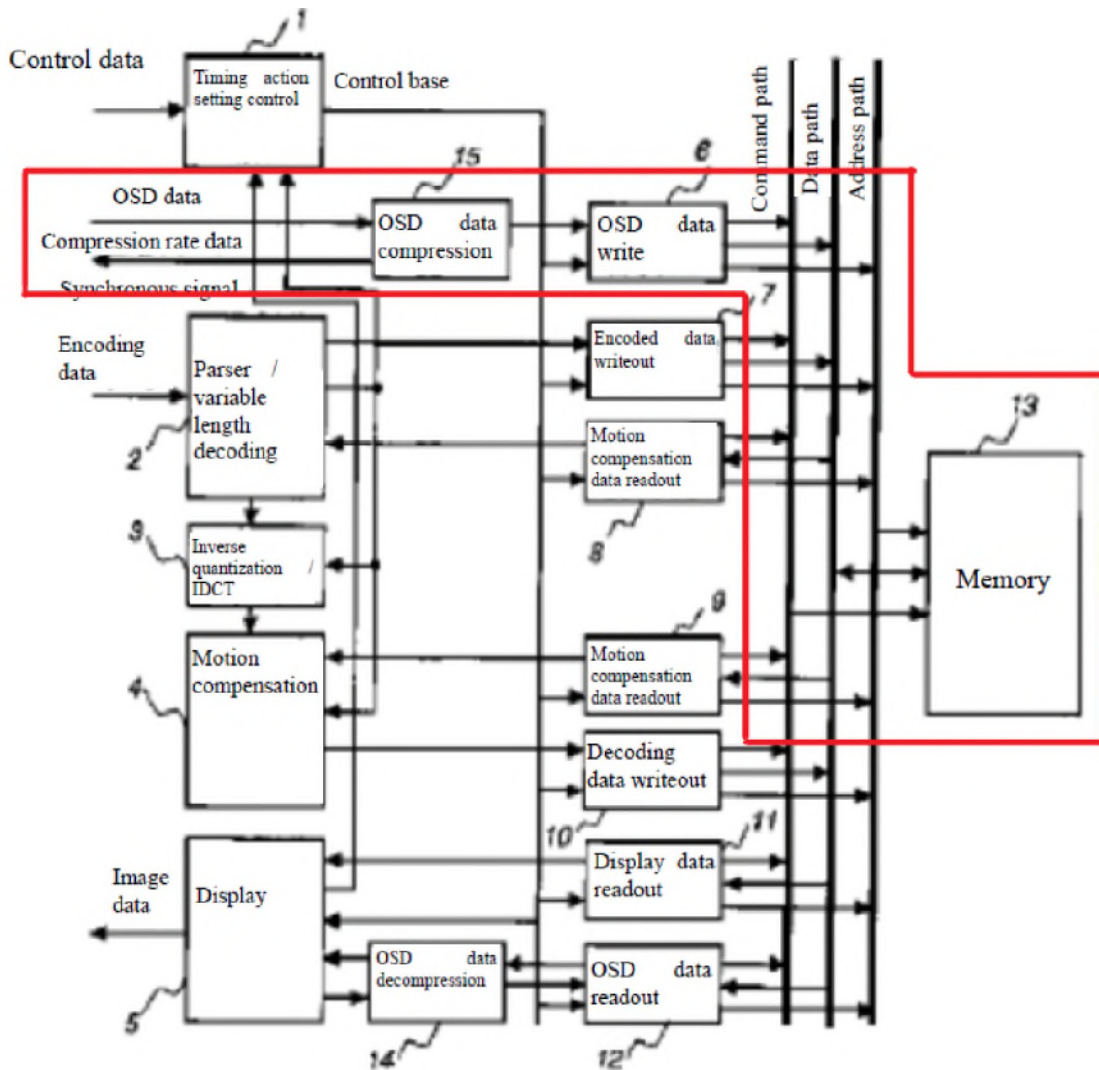
Oku explicitly teaches the use of compression to store both bitmap data and image data in the same memory. Ex. 1004, ¶¶8-9. Oku recognized the need to use compression to allow both image data and bitmap data to be stored in the same memory. *Id.* A POSITA combining Abe with AAPA would have recognized that the memory in AAPA may lack capacity to store both image data and bitmap data and that cost could be reduced by using compression and a single smaller memory, as explicitly taught by Oku. *Id.*; *KSR*, 550 U.S. at 419-20.

This combination would also be obvious to try, as market forces would encourage allowing a competitive digital television to be made at lower cost by using less memory, as taught by Oku. Ex. 1004, ¶¶8-9. It was known that compression could reduce the amount of memory required. *Id.* The combination is therefore both obvious to try and market forces suggested this well-known adaptation would be an obvious design choice. *Id.*; *KSR*, 550 U.S. at 417, 421.

In addition, Oku's compression circuit and digital television disclosed by Abe and AAPA would have been the combination of known prior art elements according to known methods to yield predictable results. Ex. 1007, ¶¶218-226.

b. Reasonable Expectation of Success

A POSITA would have had a reasonable expectation of success to combine the AAPA with Abe and Oku. Ex. 1007, ¶¶222-226. Oku teaches placing the OSD data compression circuit 15 inline for processing the OSD data after it has been received, and then writing the compressed data into memory 1-3 using OSD data writing circuit 6:



Ex. 1004, FIG. 2 (annotated).

Similarly, AAPA teaches receiving text data that, if necessary, is converted into a bitmap and then stored. Ex. 1001, 2:29-31, FIG. 1. Abe also teaches receiving text data that is converted into bitmap data and then stored in display memory 32. Ex. 1005, 7:60-67, FIG. 4. AAPA and Abe would both work as expected with a compressor circuit of Oku placed after the receipt and processing

into bitmap form and before storing that bitmap into memory.. Ex. 1007, ¶¶227-229.

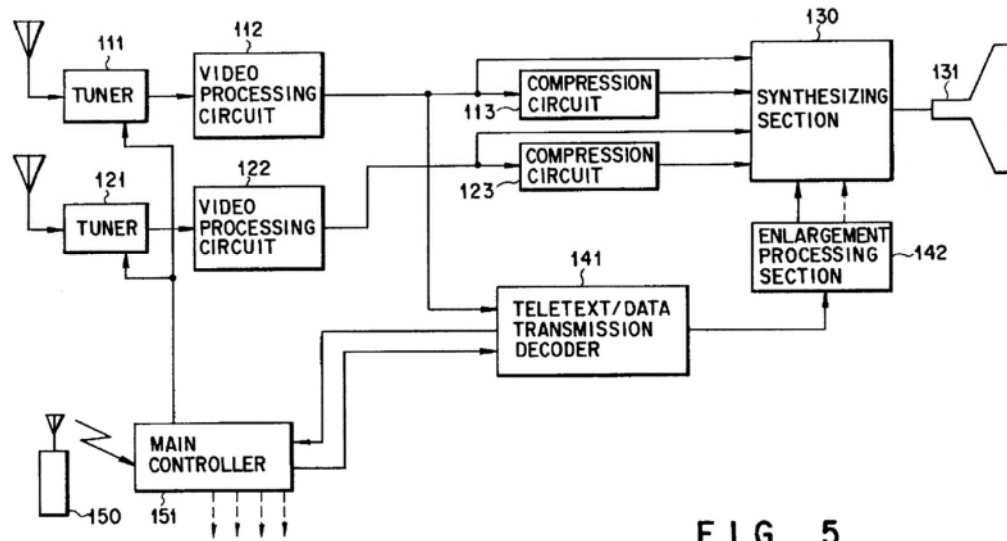
2. **Claim 3: “The digital television as defined in claim 2, wherein the data processing part further comprises a bit map decompressor configured to read the compressed bit map data from the memory to thereby restore the read data to its original bit map data, and a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution.”**

The additional limitations of claim 3 would have been obvious over the combination of Abe, AAPA, and Oku.

Oku discloses OSD data decompression circuit 14, which is a bitmap decompressor that reads the compressed bitmap data stored in memory. This retrieves compressed bitmap data and restores it as original bitmap data. Ex. 1004, ¶ [0022].

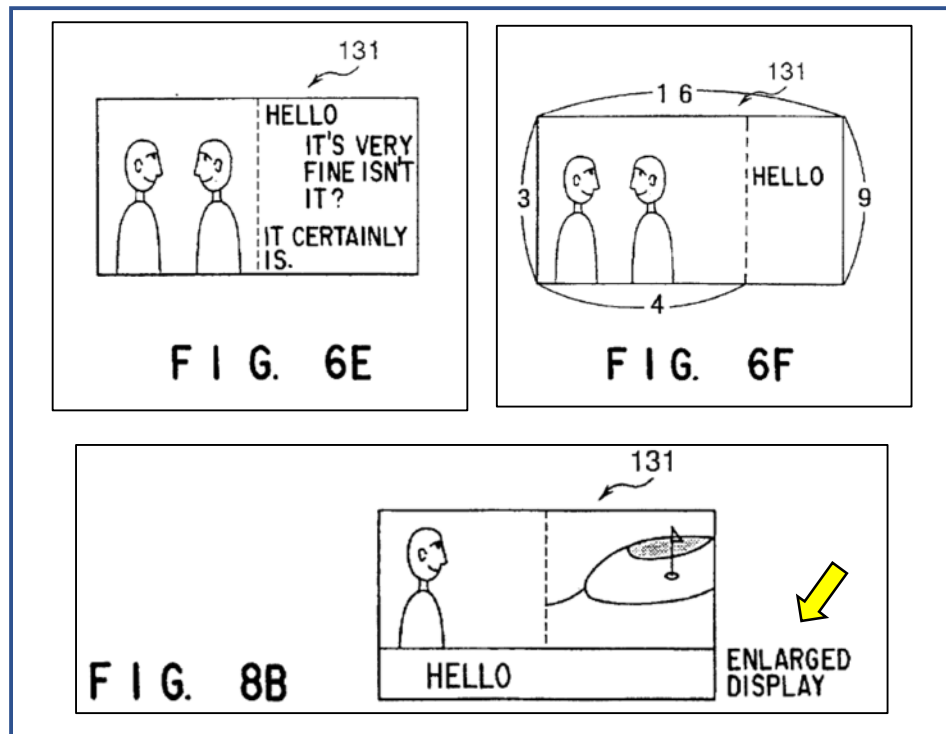
Regarding “a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution,” Abe discloses converting the format of the decompressed bit map data to correspond with the display resolution. Abe’s processing first prepares the character “display data” (i.e., bit map data) in memory. The “enlargement processing section 142” may then

resize the teletext text and graphics in order to match the output display resolution.



Ex. 1005, FIG. 5.

Abe recognized that television receiving sets were capable of displaying one or a plurality of television images at a variety of different display resolutions. *Id.*, 2:10-11; 2:12-15; 2:40-45; 2:16-21. Some illustrative examples from Abe showing one or two television images being displayed at different display resolutions on the television screen with superimposed text are reproduced below:



Ex. 1005, FIGS. 6, 8 (annotated).

When the television receiving set splits the screen into two or more sections or displays images for a wide screen, Abe teaches that superimposing text and graphics (referred to as a *supplementary program* in Abe) on a television image (referred to as the *proper program* in Abe) may lead to problems with the clarity and visibility of the text. *Id.*, 2:40-52. In particular, Abe teaches that the text and graphics may become “hardly discernable from the proper program” (*Id.*, 2:48-49) or “hardly recognizable” (*Id.*, 2:34-35) and that the text characters and graphics “*can be enlarged to make them clearly visible.*” (*Id.*, 3:7-8, emphasis added). This is shown, e.g., in FIG. 8B above where the yellow arrow (added) points to the

original annotation “ENLARGED DISPLAY” indicating that the superimposed text on the television screen has been enlarged. *Id.*, 9:59-63.

Enlarging the superimposed text as illustrated in FIG. 8B is one of the express, intended purposes of Abe’s Enlargement Processing Section 142 shown in the embodiments of FIG. 5 and FIG. 12. *Id.*, 3:7-8, 8:22-25, 9:59-67, 11:9-14. In the combination of Abe, AAPA, and Oku, once the compressed text bit map data has been restored by Oku’s decompression circuit 14, then Abe’s Enlargement Processing Section 142 can resize the decompressed text bit map data *at will*. Ex. 1005, 9:59-60. A POSITA would understand that “at will” includes the specific case where the text must be *enlarged* to make it clearly visible (*Id.*, 3:7-8) because the television screen has been divided into two or more sections (*Id.*, 2:12-13, 2:27-32, 2:40-45) as shown in FIGS. 6E, 6F, and 8B above with the result that teletext data originally intended to be displayed on the entire television screen is instead displayed on a smaller section of the screen. Enlargement of the text by Abe’s Enlargement Processing Section 142 meets the limitation of “a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution” because the text is being enlarged to make it clearly visible when displayed in a small section of the screen that has a different display resolution compared to the display resolution of the entire screen.

In Abe's embodiments shown in FIG. 5 and FIG. 12, Abe's Enlargement Processing Section 142 is activated "by the user operating a remote control unit." *Id.*, 8:22-25; see also *Id.*, 11:24-26. Abe's Enlargement Processing Section 142 meets the limitation of "a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution" in the combination of Abe, AAPA, and Oku. The claim requires only that the format converter be *configured* to convert the format of the decompressed bit map data to correspond with display resolution. In the combination of Abe, AAPA, and Oku, Abe's Enlargement Processing Section 142 (FIGS. 5 and 12) is *configured* to convert the format of the decompressed bit map data upon receiving a signal from the remote control unit. *Id.*, 8:22-25, 11:24-26. The '452 patent claims are silent as to how the format conversion is to be performed and nowhere recites language that would preclude the use of a remote control signal to activate the format conversion. Additionally, Abe's claims 4 (*Id.*, 12:45-49) and 11 (*Id.*, 14:14-17), discloses "processing the output signal of said decoding means for enlargement" and a POSITA would have understood that reception of a remote control signal is but one option for how Abe's Enlargement Processing Section 142 may be activated. Ex. 1007, ¶¶230-237.

Another option within the scope of Abe's disclosure which would have been obvious for a POSITA to try in the combination of Abe, AAPA, and Oku would be

for Abe's Enlargement Processing Section 142 to be activated automatically based on display resolution. Ex. 1007, ¶237. A POSITA would have appreciated from Abe that with the different supported display resolutions in AAPA, presenting fixed-sized text bitmaps in the image may make the displayed text too small to be readily or clearly legible, which is one of the problems that Abe explicitly intended to solve. Ex. 1005, 2:26-53; 3:7-8; 2:54-59. In particular, when displaying a full-screen image of bit map teletext data such as that shown in Abe's FIG. 7B (*Id.*, 9:41-44), a POSITA would have realized that a text font bitmap that displayed legibly on a television screen with a resolution of 720 x 480 would be approximately 2.25 times smaller if rendered on a screen with a resolution of 1920 x 1080. Ex. 1007, ¶237. Because Abe discloses a single character font ROM and using enlargement to make the text more legible, a POSITA would understand that the format conversion in Abe is particularly well-suited to the combination of Abe, AAPA, and Oku. In order to realize the combination a POSITA would use the enlargement processing section to allow the resizing of text data in Abe in a digital television according to AAPA. Ex. 1007, ¶¶230-237.

3. **Claim 5: “The digital television as defined in claim 2, wherein the bit map converter converts the text data into the bit map data, if it is determined that the text data is not the bit map data.”**

These limitations were also obvious in view of the combination of Abe with AAPA and Oku. Abe discloses converting text data into bitmap data when it is not bitmap data. Specifically, Abe receives “transmitted character data” that is “converted” into bitmap data so that it can be displayed. Ex. 1005, 7:62-67. In addition to “characters,” teletext programs in Abe may also include “images.” Ex. 1005, 5:38-46. Abe also discloses that the teletext includes both “characters” and “graphics”: “the signal coming from the teletext/data transmission decoder 141 and *representing characters and graphics...*” *Id.*, 8:12-14 (emphasis added).

The conversion of the text data is described in a way well-understood by a POSITA, by looking up the character in a character font ROM that corresponds to a received code. *Id.*, 7:5-8.

The additional limitations are also obvious in the combination of Abe with AAPA and Oku. Abe discloses converting text data into bitmap data when it is not bitmap data. Specifically, Abe receives “transmitted character data” that is “converted” into bitmap data so that it can be displayed. *Id.*, 7:62-67. In addition to “characters,” teletext programs in Abe may also include “images” and “graphics.” *Id.*, 5:38-46; 8:12-14.

A POSITA would have understood that because the character data is converted into a bitmap, and is assembled with graphics for overlay on the displayed video data, the graphics would also inherently and necessarily have been received as a bitmap. This is supported by the fact that Abe does not disclose conversion of graphics to bitmaps and does disclose conversion of characters of text data to bitmaps. Ex. 1007, ¶¶238-243.

4. **Claim 6: “The digital television as defined in claim 2, wherein the bit map converter bypasses the text data, if it is determined that the text data is the bit map data.”**

Abe discloses converting character data into bitmap for display through a character conversion function using font ROM 29. Ex. 1005, 7:4-9, 60-67.

POSITA would have understood that Abe discloses receipt of graphics data that is already in bitmap form in the data signal, or in the alternative receipt of text data that needs to be converted into bitmap data by decoder 141. Ex. 1007, ¶199. The detection of text data results in Abe’s decoder 141, which meets the limitation of the bit map converter, converting text data into bit map data. *Id.* Ex. 1007, ¶244.

5. **Claim 7: “The digital television as defined in claim 2, wherein the predetermined compression coding is a run-length compression coding.”**

Oku discloses the use of run-length compression coding in its OSD compression circuit 15 and OSD data decompression circuit 15. Ex. 1004, ¶22; Ex. 1007, ¶245.

6. **Independent Claim 12**

Claim 12 is essentially the same as claim 1 with the addition of the compressor and decompressor limitations discussed with regard to Ground 3, claims 2 and 3. Claim 12 is obvious over the combination of Abe, AAPA and Oku. Ex. 1007, ¶246.

A. **[12.a]: “A digital television having a data processing device and a display, comprising:”**

Like for Ground 2, claim 1, the preamble is not limiting. Also, Abe, AAPA, and Oku disclose it as stated for limitations 1.a and 1.c in Ground 2, *supra*.

B. **[12.b]: “a bit map converter configured to determine whether text data to be displayed on the display is bit map data and to convert the text data into bit map data;”**

This limitation is disclosed for the reasons stated for limitation 1.c in Ground 2, and Ground 3, claim 2, *supra*.

C. **[12.c]: “a bit map compressor configured to compress the bit map data by using compression coding;”**

This limitation is disclosed by Oku for the reasons stated for Ground 3, claim 2, *supra*.

D. **[12.3]: “a bit map decompressor configured to read the compressed bit map data from a memory for restoring read data to its original bit map data; and”**

This limitation is disclosed by Oku for the reasons stated for Ground 3, claim 3, *supra*.

- E. **[12.4]: “a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution.”**

This limitation is disclosed for the reasons stated for limitation 1.c in Ground 2, and Ground 3, claim 3, *supra*.

7. **Claim 13: “The digital television as defined in claim 12, wherein the text data is at least one among HTML data, DHTML data, XML data, SGML data and bit map data.”**

Claim 13 is disclosed for the reasons stated for claim 8 in Ground 2 and Ground 3, claim 3, *supra*. Ex. 1007, ¶247.

8. **Claim 14: “The digital television as defined in claim 12, wherein the bit map converter converts the text data into bit map data if it is determined that the text data is not bit map data.”**

Claim 14 is disclosed for the reasons stated for Ground 3, claim 5 and Ground 3, claim 3. *Id.*, ¶254; Ex. 1007, ¶248.

9. **Claim 15: “The digital television as defined in claim 12, wherein the bit map converter bypasses the text data if it is determined that the text data is bit map data.”**

Claim 15 is disclosed for the reasons stated for Ground 2, claim 6 and Ground 3, claim 3. *Id.*, ¶249.

10. **Claim 16: “The digital television as defined in claim 12, wherein the predetermined compression coding is a run-length compression coding.”**

Claim 16 is disclosed for the reasons stated for Ground 2, claim 7 and Ground 3, claim 3. *Id.*, ¶250.

11. **Claim 17: “The digital television as defined in claim 12, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data previously stored in the memory.”**

Claim 17 is obvious for the reasons stated for Ground 3, claim 9 and claim 10. *Id.*, ¶251.

In the alternative, Abe’s font ROM 29 also stores bitmap data used for text data conversion that is stored in memory prior to performing bitmap conversion. Ex. 1005, 7:4-9.

12. **Claim 19: “The digital television as defined in claim 12, wherein the display displays different resolution images.”**

Claim 19 is disclosed for the same reasons stated for Ground 2, claim 11, and Ground 3, claim 12, *supra*. Ex. 1007, ¶252.

13. **Independent Claim 20**

Claim 20 is essentially the same as claim 12. Claim 20 is invalid for the reasons discussed with reference to claim 12. *Id.*, ¶253.

- a. **[20.a]: “A digital television having a data processing device and a display, comprising:”**

This limitation is disclosed for the reasons stated for limitations [1.a] and [1.c] in Ground 2, claim 1.

- B. [20.b]: “a bit map converter configured to determine whether text data to be displayed on the display is bit map data and configured to convert the text data into bit map data;”**

This limitation is disclosed for the same reasons stated for limitation 1.c in Ground 2, claim 1, and claim 2, Ground 2.

- C. [20.c]: “a format converter configured to convert the format of the decompressed bit map data to correspond with display resolution;”**

This limitation is disclosed for the reasons stated for limitation 1.c in Ground 2, claim 1, and Ground 3, claim 3.

- D. [20.d]: “a bit map compressor configured to compress the bit map data by using compression coding; and”**

This limitation is disclosed for the reasons stated for Ground 2, claim 2.

- E. [20.e]: “a bit map decompressor configured to read the compressed bit map data from a memory for restoring read data back to its original bit map data.”**

This limitation is disclosed for the reasons stated for Ground 3, claim 3.

- 14. Claim 21: “The digital television as defined in claim 20, wherein the conversion of the text data is carried out by using either first bit map data or second bit map data previously stored in the memory.”**

Claim 21 is disclosed for the same reasons stated for claims 9 and 10 in Ground 2, *supra*. Ex. 1007, ¶251.

15. **Claim 23: “The digital television as defined in claim 20, wherein the display displays different resolution images.”**

Claim 23 is disclosed for the same reasons stated for claim 11 in Ground 2, *supra. Id.*, ¶254.

VII. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION TO DENY INSTITUTION

A. 35 U.S.C. § 314(a)

The Board should grant institution notwithstanding the parallel litigation between Patent Owner and Petitioners. In determining whether the exercise its discretion to deny institution of IPR in view of a parallel proceeding, the Board considers the “Fintiv” factors articulated in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (P.T.A.B. Mar. 20, 2020) (precedential) (“*Fintiv*”).

Fintiv factor 1 is neutral, and *Fintiv* factors 2-6 weigh in favor of institution.

1. **Factor 1: The parallel proceeding is not stayed, and it is unknown whether a stay would be granted**

Fintiv factor 1 is neutral. This factor considers whether the court presiding over the parallel proceeding has granted a stay or likely would grant a stay if the Board institutes IPR. *Fintiv*, Paper 11 at 6. Where a stay has not been granted, and it is unknown whether the presiding court would grant a stay if the Board institutes IPR, this factor is neutral. *See Cisco Sys., Inc. v. Estech Sys., Inc.*, IPR2021-00333, Paper 12 at 10 (PTAB July 7, 2021) (finding *Fintiv* factor 1 neutral after “declin[ing] to speculate on the likelihood of a stay.”).

In this case, neither party requested a stay in the parallel proceeding, and it is unknown whether the Court would grant a stay if the IPR is instituted.

Accordingly, this factor is neutral.

2. Factor 2: The trial will commence near the due date of a Final Written Decision

This factor weighs in favor of institution. The answer to the complaint was due on August 15. The Court in the parallel proceeding has issued a schedule. Currently, the Court has jury selection set for February 5, 2024. Ex. 1016, p. 1

Further, the Interim *Fintiv* Guidance² states: “Parties may present evidence regarding the most recent statistics on median time-to-trial for civil actions in the district court in which the parallel litigation resides for the PTAB's consideration.” USPTO *Fintiv* Guidance, 8-9. The Interim *Fintiv* Guidance states that such statistics are available a U.S. District Courts—Combined Civil and Criminal Federal Court Management Statistics (March 31, 2022) (“U.S. District Court

2

https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_d enials_aia_parallel_district_court_litigation_memo_20220621 .pdf (“USPTO *Fintiv* Guidance”).

Statistics”).³ *Id.* at 9 n.12. The most recent statistic on median time-to-trial for civil actions in the Eastern District of Texas is 24.2 months. Ex. 1017, p. 35.

Here, the complaint was filed on April 21, 2022. Ex. 1028. Applying the above statistic, the expected trial date would be approximately May 2024, very near the Board’s FWD deadline in this case which should be about July 2024. In such circumstances, accounting for slippage in the district court schedule, the Board should weigh *Fintiv* factor 2 as against exercising discretion to deny institution. *See, e.g., Dish Network L.L.C. v. Broadband iTV, Inc.*, IPR2020-01332, Paper 14 at 21-26 (PTAB Jan. 27, 2021); *Hanwha Solutions Corp. v. REC Solar Pte. Ltd.*, IPR2021-00989, Paper 12 at 14 (PTAB Dec. 13, 2021).

3. Factor 3: The parties’ investments in the parallel proceeding weigh in favor of institution

Fintiv factor 3 favors institution. This factor considers “the investment in the parallel proceeding by the court and the parties.” *Fintiv*, Paper 11 at 6. As stated, the date of the FWD is estimated to be in July 2024. 35 U.S.C. § 314(b); 37 CFR § 42.107(b).

A scheduling conference was held September 29, 2022. The date for a claim construction hearing and jury selection are August 15, 2023, and February 5, 2024

³ Available at <https://www.uscourts.gov/statistics/table/nadefederal-court-management> - statistic s/2022/03/31 -1.

respectively. Ex.1016. The deadline to substantially complete document production in the parallel proceeding and file opening claim construction briefs is set for July 5, 2023, completion of fact and expert discovery is September 5, 2023 and October 17, 2023, respectively. The Decision on Institution (approximately July 2023) will be well before most of those deadlines. *Id.* Moreover, the District Court will not have considered any dispositive issues in the case, or any invalidity issues based on the prior art. Accordingly, this factor favors institution.

4. Factor 4: IPR will address issues not raised in the parallel proceeding

Fintiv factor 4 will likely favor institution. On September 8, 2022, Plaintiff served infringement contentions in the parallel litigation asserting infringement of claims 1-3, 5-17, 19-21, and 23. This Petition asserts invalidity of all 20 claims. Further, Petitioners submitted a stipulation (Ex. 1027) that if IPR is instituted they will not pursue in the parallel proceeding invalidity positions that are brought or could have brought in this Petition. The Board recognizes with regard to factor 4 such stipulation weighs against exercising discretion. *Acuity Brands Lighting, Inc. v. Ultravision Technologies, LLC*, IPR2020-01638, Paper 8 at 12-13 (PTAB May 6, 2021). Accordingly, factor 4 also favors institution.

5. Factor 5: PO and Petitioners are parties in the parallel proceeding

In addition, when the Board’s deadline for FWD is close to the district court trial date and the parties are the same in both proceedings, *Fintiv* factor 5 typically weighs against exercising discretion to deny institution. *See, e.g., Dish Network L.L.C. v. Broadband iTV, Inc.*, IPR2020-01332, Paper 14 at 30-31 (PTAB Jan. 27, 2021); *Hanwha Solutions Corp.*, IPR2021-00989, Paper 12 at 17.

6. Factor 6: Other circumstances weigh in favor of institution

The merits of this Petition are strong. The Petition exposes the claims are merely obvious combinations of elements that were well-known in the prior art. The Board has found *Fintiv* factor 6 “strongly weighs against denying institution” in view of similarly strong petitions. *HP Inc. v. Slingshot Printing LLC*, IPR2020-01084, Paper 13 at 11-12 (PTAB Jan. 13, 2021).

Considerations of efficiency and fairness also favor institution. PO asserts six patents in the parallel proceeding. Rather than leave to the District Court the issues of invalidity and non-infringement for all six patents, it is more efficient for the Board to address the invalidity grounds in this Petition.

Moreover, the Board’s technically trained judges are well suited to assess the patentability grounds presented in this Petition. This fact weighs heavily against discretionary denial. *Fintiv* factor 6 favors institution.

In this case, *Fintiv* factor 1 is neutral and factors 2-6 favor institution.

B. 35 U.S.C. § 325(d)

Under 35 U.S.C. § 325(d), “[i]n determining whether to institute . . . the Director may take into account whether . . . the same or substantially the same prior art or arguments previously were presented to the Office.”

Mitani, Oku, and Abe are not cited on the face of the ’452 patent and are not referenced in the file history of the ’452 patent with the consequence that factors c, d, e, and f are not applicable.

This Petition shows that had the Examiner considered the combinations set forth in this Petition, the obviousness of the claims would have been manifest (factors (a) and (b)).

Thus, in this case, these factors counsel against the Board exercising its discretion under 35 U.S.C. § 325(d).

I. CONCLUSION

Petitioners request institution of an *inter partes* review to cancel these claims.

Dated: January 13, 2023

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioners hereby certify, in reliance on the word count feature provided by the word-processing system used to prepare this Petition, that the number of words in this Petition is 13,863. Pursuant to 37 C.F.R. § 42.24(a), words in the table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, certificate of word count, appendix of exhibits, and claim listing were excluded.

Dated: January 13, 2023

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing Petition and all exhibits and other documents filed together with the Petition were served on January 13, 2023 via Federal Express on the attorney of record for Patent Owner at the following address:

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