



Publication number: **0 530 748 A3**

EUROPEAN PATENT APPLICATION

Application number: **92114927.4**

Int. Cl.⁵: **B41J 2/36**

Date of filing: **01.09.92**

Priority: **03.09.91 US 754097**

Date of publication of application:
10.03.93 Bulletin 93/10

Designated Contracting States:
DE FR GB

Date of deferred publication of the search report:
24.03.93 Bulletin 93/12

Applicant: **EASTMAN KODAK COMPANY**
343 State Street
Rochester, New York 14650-2201(US)

Inventor: **Fiscella, Marcello David**
c/o EASTMAN KODAK COMPANY, 343 State
Street
Rochester, New York 14650-2201(US)
Inventor: **No, Young**
c/o EASTMAN KODAK COMPANY, 343 State
Street
Rochester, New York 14650-2201(US)

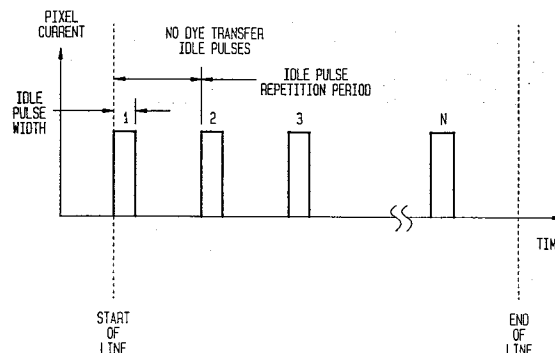
Representative: **Wagner, Karl H. et al**
WAGNER & GEYER European Patent
Attorneys Gewürzmühlstrasse 5
W-8000 München 22 (DE)

Printer head modulation technique for thermal printers.

The present invention relates to a technique including method and apparatus for modulating the power to thermal pixels of a thermal print head (18). The technique energizes each thermal pixel with a plurality of N-M idle power modulating pulses and a plurality of M print power modulating pulses during each line printing period. The idle power modulating pulses are used for substantially maintaining the thermal pixel at a first temperature which is (1) below a dye transfer temperature of a dye color on a dye carrier member, and (2) above a base temperature of a material forming a heat sink of the print head. The print power modulating pulses are used to raise the first temperature of the thermal pixel to a second temperature above the dye transfer temperature of the dye carrier member so as to cause an M dye color density level of N density levels of the dye color to be transferred from the dye carrier member to a receiver member engaging the dye carrier member opposite the thermal pixel, where M is a value between 0 and N. Alternatively, for modulating large area thermal pixels, two sequential sets of N power modulating pulses can be generated, each

plurality of N pulses having M/2 print power modulating pulses. During a first line printing period, after a cold start, a plurality of idle power modulating pulses can initially be generated to raise each thermal pixel from the base temperature to the first temperature.

FIG. 4





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EUROPEAN SEARCH REPORT

Application Number

EP 92 11 4927

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	EP-A-0 421 353 (SEIKO EPSON CORPORATION) * page 3, line 33 - page 5, line 57; figures * ---	1-6,9,10	B41J2/36
Y	PATENT ABSTRACTS OF JAPAN vol. 10, no. 365 (M-542)(2422) 6 December 1986 & JP-A-61 160 257 (RICOH CO LTD) 19 July 1986 * abstract * ---	1-6,9,10	
A	DE-A-3 833 746 (SIEMENS AG) * the whole document * ---	1-10	
A	US-A-4 568 817 (S. LENG ET AL.) * the whole document * ---	1-10	
A	PATENT ABSTRACTS OF JAPAN vol. 13, no. 20 (M-785)(3368) 18 January 1989 & JP-A-63 230 368 (CANON INC) 26 September 1988 * abstract * ---	1-10	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A	PATENT ABSTRACTS OF JAPAN vol. 7, no. 244 (M-252)(1389) 28 October 1983 & JP-A-58 131 080 (CANON K.K.) 4 August 1983 * abstract * ---	1-10	B41J
A	PATENT ABSTRACTS OF JAPAN vol. 11, no. 348 (M-642)(2795) 14 November 1987 & JP-A-62 128 767 (TOKYO ELECTRIC CO LTD) 11 June 1987 * abstract * -----	1-10	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 JANUARY 1993	Examiner FERRIGNO A.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			