Related U.S. Application Data

continuation of application No. 13/217,885, filed on Aug. 25, 2011, now Pat. No. 8,233,666, which is a continuation of application No. 12/950,643, filed on Nov. 19, 2010, now Pat. No. 8,068,643, which is a continuation of application No. 12/853,616, filed on Aug. 10, 2010, now Pat. No. 7,995,799, which is a continuation of application No. 12/186,889, filed on Aug. 6, 2008, now Pat. No. 7,787,659, which is a continuation of application No. 10/701,839, filed on Nov. 5, 2003, now Pat. No. 7,424,133.

(60) Provisional application No. 60/425,275, filed on Nov. 8, 2002.

(51) **Int. Cl.**

G06T 17/05	(2011.01)
G06T 3/40	(2006.01)
G06T 7/60	(2006.01)
G03B 15/00	(2006.01)
G01C 11/02	(2006.01)
G03B 37/02	(2006.01)
G01C 11/04	(2006.01)
G06T 11/20	(2006.01)

(52) **U.S. Cl.**

CPC ***G03B 37/02*** (2013.01); ***G06K 9/0063*** (2013.01); ***G06T 3/4038*** (2013.01); ***G06T 7/0097*** (2013.01); ***G06T 7/602*** (2013.01); ***G06T 11/203*** (2013.01); ***G06T 17/05*** (2013.01); *G06T 2207/10032* (2013.01); *G06T 2207/30204* (2013.01)

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,594,556	A		7/1971	Edwards
3,614,410	A		10/1971	Bailey
3,621,326	A		11/1971	Hobrough
3,661,061	A		5/1972	Tokarz
3,716,669	A		2/1973	Watanabe et al.
3,725,563	A		4/1973	Woycechowsky
3,864,513	A		2/1975	Halajian et al.
3,866,602	A		2/1975	Furihata
3,877,799	A		4/1975	O'Donnell
4,015,080	A		3/1977	Moore-Searson
4,044,879	A		8/1977	Stahl
4,184,711	A		1/1980	Wakimoto
4,240,108	A		12/1980	Levy
4,281,354	A		7/1981	Conte
4,290,694	A	*	9/1981	Wehrli et al. 356/2
4,313,678	A	*	2/1982	Colvocoresses 356/2
4,344,683	A		8/1982	Stemme
4,360,876	A		11/1982	Girault et al.
4,382,678	A		5/1983	Thompson et al.
4,387,056	A		6/1983	Stowe
4,396,942	A		8/1983	Gates
4,463,380	A		7/1984	Hooks
4,489,322	A		12/1984	Zulch et al.
4,490,742	A		12/1984	Wurtzinger
4,491,399	A		1/1985	Bell
4,495,500	A		1/1985	Vickers
4,527,055	A		7/1985	Harkless et al.
4,543,603	A		9/1985	Laures
4,586,138	A		4/1986	Mullenhoff et al.
4,635,136	A		1/1987	Ciampa et al.
4,653,136	A		3/1987	Denison
4,653,316	A		3/1987	Fukuhara
4,673,988	A		6/1987	Jansson et al.
4,686,474	A		8/1987	Olsen et al.
4,688,092	A		8/1987	Kamel et al.
4,689,748	A		8/1987	Hofmann
4,707,698	A		11/1987	Constant et al.
4,758,850	A	*	7/1988	Archdale et al. 396/8
4,805,033	A		2/1989	Nishikawa
4,807,024	A		2/1989	McLaurin et al.
4,814,711	A		3/1989	Olsen et al.
4,814,896	A		3/1989	Heitzman et al.
4,843,463	A		6/1989	Michetti
4,899,296	A		2/1990	Khattak
4,906,198	A		3/1990	Cosimano et al.
4,953,227	A		8/1990	Katsuma et al.
4,956,872	A		9/1990	Kimura
5,034,812	A		7/1991	Rawlings
5,086,314	A		2/1992	Aoki et al.
5,121,222	A		6/1992	Endoh et al.
5,138,444	A		8/1992	Hiramatsu
5,155,597	A		10/1992	Lareau et al.
5,164,825	A		11/1992	Kobayashi et al.
5,166,789	A		11/1992	Myrick
5,191,174	A		3/1993	Chang et al.
5,200,793	A		4/1993	Ulich et al.
5,210,586	A		5/1993	Grage et al.
5,231,435	A		7/1993	Blakely
5,247,356	A	*	9/1993	Ciampa 348/144
5,251,037	A	*	10/1993	Busenberg 348/147
5,265,173	A		11/1993	Griffin et al.
5,267,042	A		11/1993	Tsuchiya et al.
5,270,756	A		12/1993	Busenberg
5,296,884	A		3/1994	Honda et al.
5,335,072	A		8/1994	Tanaka et al.
5,342,999	A		8/1994	Frei et al.
5,345,086	A		9/1994	Bertram
5,353,055	A		10/1994	Hiramatsu
5,369,443	A		11/1994	Woodham
5,402,170	A		3/1995	Parulski et al.
5,414,462	A	*	5/1995	Veatch 348/135
5,467,271	A	*	11/1995	Abel et al. 702/5
5,481,479	A		1/1996	Wight et al.
5,486,948	A		1/1996	Imai et al.
5,506,644	A		4/1996	Suzuki et al.
5,508,736	A		4/1996	Cooper
5,555,018	A		9/1996	von Braun
5,596,494	A		1/1997	Kuo
5,604,534	A		2/1997	Hedges et al.
5,617,224	A		4/1997	Ichikawa et al.
5,625,409	A	*	4/1997	Rosier et al. 348/117
5,633,946	A	*	5/1997	Lachinski et al. 382/103
5,668,593	A		9/1997	Lareau et al.
5,677,515	A		10/1997	Selk et al.
5,798,786	A	*	8/1998	Lareau et al. 348/144
5,805,289	A	*	9/1998	Corby et al. 356/613
5,835,133	A		11/1998	Moreton et al.
5,841,574	A		11/1998	Willey
5,844,602	A	*	12/1998	Lareau et al. 348/144
5,852,753	A		12/1998	Lo et al.
5,894,323	A	*	4/1999	Kain et al. 348/116
5,899,945	A		5/1999	Baylocq et al.
5,963,664	A		10/1999	Kumar et al.
5,995,681	A	*	11/1999	Lee et al. 382/293
6,037,945	A		3/2000	Loveland
6,088,055	A	*	7/2000	Lareau et al. 348/113
6,094,215	A		7/2000	Sundahl et al.
6,097,854	A		8/2000	Szeliski et al.
6,108,032	A	*	8/2000	Hoagland 348/144
6,130,705	A	*	10/2000	Lareau et al. 348/144
6,157,747	A		12/2000	Szeliski et al.
6,167,300	A		12/2000	Cherepenin et al.
6,222,583	B1		4/2001	Matsumura et al.
6,236,886	B1		5/2001	Cherepenin et al.
6,256,057	B1	*	7/2001	Mathews et al. 348/144
6,373,522	B2	*	4/2002	Mathews et al. 348/144
6,421,610	B1		7/2002	Carroll et al.
6,434,280	B1		8/2002	Peleg et al.
6,549,683	B1	*	4/2003	Bergeron et al. 382/298
6,597,818	B2		7/2003	Kumar et al.
6,600,553	B1	*	7/2003	Stone 356/4.01
6,639,596	B1		10/2003	Shum et al.
6,711,475	B2		3/2004	Murphy
6,731,329	B1	*	5/2004	Feist et al. 348/135
6,735,348	B2	*	5/2004	Dial et al. 382/293