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Vehicular video camera display system

Abstract

A vehicular video camera display system includes an interior rearview mirror assembly having a mirror head accommodating an electrochromic reflective element, with a video display device disposed in the mirror head behind the electrochromic reflective element. With the interior rearview mirror assembly disposed at the in-cabin side of a windshield of a vehicle, a video display screen of the video display device is operable to display video images that are viewable through the electrochromic reflective element by a driver of the vehicle. Image data captured by a rearward-viewing video camera is communicated via a cable as a digital signal from the rearward-viewing video camera to control circuitry. The video display device displays video images that are derived, at least in part, from image data communicated from the rearward-viewing video camera to the control circuitry. The control circuitry controls display at the video display device of the video images.

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References Cited

U.S. PATENT DOCUMENTS

Patent No.	Issued Date	Patentee Name	U.S. Cl.	CPC
2166303	12/1938	Hodney et al.	N/A	N/A
2414223	12/1946	De Virgilis	N/A	N/A
3004473	12/1960	Athur et al.	N/A	N/A
3075430	12/1962	Woodward et al.	N/A	N/A
3141393	12/1963	Platt	N/A	N/A
3152216	12/1963	Woodward	N/A	N/A
3185020	12/1964	Thelen	N/A	N/A
3280701	12/1965	Donnelly et al.	N/A	N/A
3432225	12/1968	Rock	N/A	N/A
3451741	12/1968	Manos	N/A	N/A
3453038	12/1968	Kissa et al.	N/A	N/A
3467465	12/1968	Noord	N/A	N/A
3521941	12/1969	Deb et al.	N/A	N/A
3543018	12/1969	Barcus et al.	N/A	N/A
3557265	12/1970	Chisholm et al.	N/A	N/A

3565985	12/1970	Schrenk et al.	N/A	N/A
3628851	12/1970	Robertson	N/A	N/A
3676668	12/1971	Collins et al.	N/A	N/A
3689695	12/1971	Rosenfield et al.	N/A	N/A
3711176	12/1972	Alfrey, Jr. et al.	N/A	N/A
3781090	12/1972	Sumita	N/A	N/A
3806229	12/1973	Schoot et al.	N/A	N/A
3807832	12/1973	Castellion	N/A	N/A
3821590	12/1973	Kosman et al.	N/A	N/A
3860847	12/1974	Carley	N/A	N/A
3870404	12/1974	Wilson et al.	N/A	N/A
3876287	12/1974	Sprokel	N/A	N/A
3978190	12/1975	Kurz, Jr. et al.	N/A	N/A
3985424	12/1975	Steinacher	N/A	N/A
4006546	12/1976	Anderson et al.	N/A	N/A
4035681	12/1976	Savage, Jr.	N/A	N/A
4052712	12/1976	Ohama et al.	N/A	N/A
4075468	12/1977	Marcus	N/A	N/A
4088400	12/1977	Assouline et al.	N/A	N/A
4093364	12/1977	Miller	N/A	N/A
4109235	12/1977	Bouthors	N/A	N/A
4139234	12/1978	Morgan	N/A	N/A
4171875	12/1978	Taylor et al.	N/A	N/A
4174152	12/1978	Giglia et al.	N/A	N/A
4211955	12/1979	Ray	N/A	N/A
4214266	12/1979	Myers	N/A	N/A
4221955	12/1979	Joslyn	N/A	N/A
4228490	12/1979	Thillays	N/A	N/A
4247870	12/1980	Gabel et al.	N/A	N/A
4257703	12/1980	Goodrich	N/A	N/A
4277804	12/1980	Robison	N/A	N/A
4281899	12/1980	Oskam	N/A	N/A
4288814	12/1980	Talley et al.	N/A	N/A
4306768	12/1980	Egging	N/A	N/A
4310851	12/1981	Pierrat	N/A	N/A
4331382	12/1981	Graff	N/A	N/A
4338000	12/1981	Kamimori et al.	N/A	N/A
4377613	12/1982	Gordon	N/A	N/A
4398805	12/1982	Cole	N/A	N/A
4419386	12/1982	Gordon	N/A	N/A
4420238	12/1982	Felix	N/A	N/A
4425717	12/1983	Marcus	N/A	N/A
4435042	12/1983	Wood et al.	N/A	N/A
4435048	12/1983	Kamimori et al.	N/A	N/A
4436371	12/1983	Wood et al.	N/A	N/A
4443057	12/1983	Bauer et al.	N/A	N/A
4446171	12/1983	Thomas	N/A	N/A
4465339	12/1983	Baucke et al.	N/A	N/A
4473695	12/1983	Wrighton et al.	N/A	N/A
4490227	12/1983	Bitter	N/A	N/A

4499451	12/1984	Suzuki et al.	N/A	N/A
4524941	12/1984	Wood et al.	N/A	N/A
4546551	12/1984	Franks	N/A	N/A
4561625	12/1984	Weaver	N/A	N/A
4580196	12/1985	Task	N/A	N/A
4581827	12/1985	Higashi	N/A	N/A
4588267	12/1985	Pastore	N/A	N/A
4603946	12/1985	Kato et al.	N/A	N/A
4626850	12/1985	Chey	N/A	N/A
4630109	12/1985	Barton	N/A	N/A
4630904	12/1985	Pastore	N/A	N/A
4638287	12/1986	Umebayashi et al.	N/A	N/A
4646210	12/1986	Skogler et al.	N/A	N/A
4652090	12/1986	Uchikawa et al.	N/A	N/A
4665430	12/1986	Hiroyasu	N/A	N/A
4671619	12/1986	Kamimori et al.	N/A	N/A
4692798	12/1986	Seko et al.	N/A	N/A
4694295	12/1986	Miller et al.	N/A	N/A
4702566	12/1986	Tukude	N/A	N/A
4712879	12/1986	Lynam et al.	N/A	N/A
4713685	12/1986	Nishimura et al.	N/A	N/A
4729076	12/1987	Masami et al.	N/A	N/A
4731669	12/1987	Hayashi et al.	N/A	N/A
4733335	12/1987	Serizawa et al.	N/A	N/A
4733336	12/1987	Skogler et al.	N/A	N/A
4740838	12/1987	Mase et al.	N/A	N/A
4761061	12/1987	Nishiyama et al.	N/A	N/A
4780752	12/1987	Angerstein et al.	N/A	N/A
4781436	12/1987	Armbruster	N/A	N/A
4789904	12/1987	Peterson	N/A	N/A
4793690	12/1987	Gahan et al.	N/A	N/A
4793695	12/1987	Wada et al.	N/A	N/A
4799768	12/1988	Gahan	N/A	N/A
4807096	12/1988	Skogler et al.	N/A	N/A
4825232	12/1988	Howdle	N/A	N/A
4826289	12/1988	Vandenbrink et al.	N/A	N/A
4847772	12/1988	Michalopoulos et al.	N/A	N/A
4855161	12/1988	Moser et al.	N/A	N/A
4859867	12/1988	Larson et al.	N/A	N/A
4862594	12/1988	Schierbeek et al.	N/A	N/A
4871917	12/1988	O'Farrell et al.	N/A	N/A
4872051	12/1988	Dye	N/A	N/A
4882565	12/1988	Gallmeyer	N/A	N/A
4883349	12/1988	Mittelhauser	N/A	N/A
4886960	12/1988	Molyneux et al.	N/A	N/A
4892345	12/1989	Rachael, III	N/A	N/A
4902108	12/1989	Byker	N/A	N/A
4910591	12/1989	Petrossian et al.	N/A	N/A
4916374	12/1989	Schierbeek et al.	N/A	N/A
4926170	12/1989	Beggs et al.	N/A	N/A

4930742	12/1989	Schofield et al.	N/A	N/A
4935665	12/1989	Murata	N/A	N/A
4936533	12/1989	Adams et al.	N/A	N/A
4937796	12/1989	Tendler	N/A	N/A
4937945	12/1989	Schofield et al.	N/A	N/A
4943796	12/1989	Lee	N/A	N/A
4948242	12/1989	Desmond et al.	N/A	N/A
4953305	12/1989	Van Lente et al.	N/A	N/A
4956591	12/1989	Schierbeek et al.	N/A	N/A
4959247	12/1989	Moser et al.	N/A	N/A
4959865	12/1989	Stettiner et al.	N/A	N/A
4970653	12/1989	Kenue	N/A	N/A
4973844	12/1989	O'Farrell et al.	N/A	N/A
4987357	12/1990	Masaki	N/A	N/A
4996083	12/1990	Moser et al.	N/A	N/A
5001558	12/1990	Burley et al.	N/A	N/A
5005213	12/1990	Hanson et al.	N/A	N/A
5006971	12/1990	Jenkins	N/A	N/A
5014167	12/1990	Roberts	N/A	N/A
5016996	12/1990	Ueno	N/A	N/A
5027200	12/1990	Petrossian et al.	N/A	N/A
5038255	12/1990	Nishihashi et al.	N/A	N/A
5056899	12/1990	Warszawski	N/A	N/A
5058851	12/1990	Lawlor et al.	N/A	N/A
5066108	12/1990	McDonald	N/A	N/A
5066112	12/1990	Lynam et al.	N/A	N/A
5073012	12/1990	Lynam	N/A	N/A
5076673	12/1990	Lynam et al.	N/A	N/A
5076674	12/1990	Lynam	N/A	N/A
5096287	12/1991	Kakinami et al.	N/A	N/A
5100095	12/1991	Haan et al.	N/A	N/A
5105127	12/1991	Lavaud et al.	N/A	N/A
5115346	12/1991	Lynam	N/A	N/A
5117346	12/1991	Gard	N/A	N/A
5121200	12/1991	Choi	N/A	N/A
5128799	12/1991	Byker	N/A	N/A
5131154	12/1991	Schierbeek et al.	N/A	N/A
5135298	12/1991	Feltman	N/A	N/A
5136483	12/1991	Schoniger et al.	N/A	N/A
5140455	12/1991	Varaprasad et al.	N/A	N/A
5142407	12/1991	Varaprasad et al.	N/A	N/A
5151816	12/1991	Varaprasad et al.	N/A	N/A
5151824	12/1991	O'Farrell	N/A	N/A
5160200	12/1991	Cheselske	N/A	N/A
5160201	12/1991	Wrobel	N/A	N/A
5173881	12/1991	Sindle	N/A	N/A
5178448	12/1992	Adams et al.	N/A	N/A
5179471	12/1992	Caskey et al.	N/A	N/A
5184956	12/1992	Langlais et al.	N/A	N/A
5189537	12/1992	O'Farrell	N/A	N/A

5193029	12/1992	Schofield et al.	N/A	N/A
5197562	12/1992	Kakinami et al.	N/A	N/A
5207492	12/1992	Roberts	N/A	N/A
5214408	12/1992	Asayama	N/A	N/A
5217794	12/1992	Schrenk	N/A	N/A
5223814	12/1992	Suman	N/A	N/A
5223844	12/1992	Mansell et al.	N/A	N/A
5229975	12/1992	Truesdell et al.	N/A	N/A
5230400	12/1992	Kakinami et al.	N/A	N/A
5233461	12/1992	Dornan et al.	N/A	N/A
5235316	12/1992	Qualizza	N/A	N/A
5239405	12/1992	Varaprasad et al.	N/A	N/A
5239406	12/1992	Lynam	N/A	N/A
5243417	12/1992	Pollard	N/A	N/A
5245422	12/1992	Borcherts et al.	N/A	N/A
5252354	12/1992	Cronin et al.	N/A	N/A
5253109	12/1992	O'Farrell et al.	N/A	N/A
5255442	12/1992	Schierbeek et al.	N/A	N/A
5277986	12/1993	Cronin et al.	N/A	N/A
5280555	12/1993	Ainsburg	N/A	N/A
5285060	12/1993	Larson et al.	N/A	N/A
5289321	12/1993	Secor	N/A	N/A
5296924	12/1993	de Saint Blancard et al.	N/A	N/A
5303205	12/1993	Gauthier et al.	N/A	N/A
5304980	12/1993	Maekawa	N/A	N/A
5305012	12/1993	Faris	N/A	N/A
5307136	12/1993	Saneyoshi	N/A	N/A
5313335	12/1993	Gray et al.	N/A	N/A
5325096	12/1993	Pakett	N/A	N/A
5325386	12/1993	Jewell et al.	N/A	N/A
5327288	12/1993	Wellington	N/A	N/A
5330149	12/1993	Haan et al.	N/A	N/A
5331312	12/1993	Kudoh	N/A	N/A
5331358	12/1993	Schurle et al.	N/A	N/A
5339075	12/1993	Abst et al.	N/A	N/A
5339529	12/1993	Lindberg	N/A	N/A
5341437	12/1993	Nakayama	N/A	N/A
D351370	12/1993	Lawlor et al.	N/A	N/A
5355118	12/1993	Fukuhara	N/A	N/A
5355284	12/1993	Roberts	N/A	N/A
5361190	12/1993	Roberts et al.	N/A	N/A
5371659	12/1993	Pastrick et al.	N/A	N/A
5373482	12/1993	Gauthier	N/A	N/A
5386285	12/1994	Asayama	N/A	N/A
5406395	12/1994	Wilson et al.	N/A	N/A
5406414	12/1994	O'Farrell et al.	N/A	N/A
5408357	12/1994	Beukema	N/A	N/A
5410346	12/1994	Saneyoshi et al.	N/A	N/A
5414461	12/1994	Kishi et al.	N/A	N/A
5416313	12/1994	Larson et al.	N/A	N/A

5416478	12/1994	Morinaga	N/A	N/A
5418610	12/1994	Fischer	N/A	N/A
5422756	12/1994	Weber	N/A	N/A
5424726	12/1994	Beymer	N/A	N/A
5424865	12/1994	Lynam	N/A	N/A
5424952	12/1994	Asayama	N/A	N/A
5430431	12/1994	Nelson	N/A	N/A
5432496	12/1994	Lin	N/A	N/A
5439305	12/1994	Santo	N/A	N/A
5444478	12/1994	Lelong et al.	N/A	N/A
5446576	12/1994	Lynam et al.	N/A	N/A
5455716	12/1994	Suman et al.	N/A	N/A
5461361	12/1994	Moore	N/A	N/A
5469298	12/1994	Suman et al.	N/A	N/A
5475366	12/1994	Van Lente et al.	N/A	N/A
5475494	12/1994	Nishida et al.	N/A	N/A
5481409	12/1995	Roberts	N/A	N/A
5483453	12/1995	Uemura et al.	N/A	N/A
5485161	12/1995	Vaughn	N/A	N/A
5485378	12/1995	Franke et al.	N/A	N/A
5487522	12/1995	Hook	N/A	N/A
5488496	12/1995	Pine	N/A	N/A
5497305	12/1995	Pastrick et al.	N/A	N/A
5497306	12/1995	Pastrick	N/A	N/A
5500760	12/1995	Varaprasad et al.	N/A	N/A
5510983	12/1995	Lino	N/A	N/A
5515448	12/1995	Nishitani	N/A	N/A
5519621	12/1995	Wortham	N/A	N/A
5521760	12/1995	De Young et al.	N/A	N/A
5523811	12/1995	Wada et al.	N/A	N/A
5525264	12/1995	Cronin et al.	N/A	N/A
5528474	12/1995	Roney et al.	N/A	N/A
5529138	12/1995	Shaw et al.	N/A	N/A
5530240	12/1995	Larson et al.	N/A	N/A
5530420	12/1995	Tsuchiya et al.	N/A	N/A
5530421	12/1995	Marshall et al.	N/A	N/A
5535056	12/1995	Caskey et al.	N/A	N/A
5535144	12/1995	Kise	N/A	N/A
5539397	12/1995	Asanuma et al.	N/A	N/A
5541590	12/1995	Nishio	N/A	N/A
5550677	12/1995	Schofield et al.	N/A	N/A
5566224	12/1995	ul Azam et al.	N/A	N/A
5567360	12/1995	Varaprasad et al.	N/A	N/A
5568316	12/1995	Schrenk et al.	N/A	N/A
5570127	12/1995	Schmidt	N/A	N/A
5572354	12/1995	Desmond et al.	N/A	N/A
5574443	12/1995	Hsieh	N/A	N/A
5576687	12/1995	Blank et al.	N/A	N/A
5576854	12/1995	Schmidt et al.	N/A	N/A
5576975	12/1995	Sasaki et al.	N/A	N/A

5587236	12/1995	Agrawal et al.	N/A	N/A
5602542	12/1996	Widmann	N/A	N/A
5608550	12/1996	Epstein et al.	N/A	N/A
5610756	12/1996	Lynam et al.	N/A	N/A
5611966	12/1996	Varaprasad et al.	N/A	N/A
5615023	12/1996	Yang	N/A	N/A
5615857	12/1996	Hook	N/A	N/A
5617085	12/1996	Tsutsumi et al.	N/A	N/A
5626800	12/1996	Williams et al.	N/A	N/A
5631089	12/1996	Center, Jr. et al.	N/A	N/A
5631638	12/1996	Kaspar et al.	N/A	N/A
5631639	12/1996	Hibino et al.	N/A	N/A
5632092	12/1996	Blank et al.	N/A	N/A
5632551	12/1996	Roney et al.	N/A	N/A
5634709	12/1996	Iwama	N/A	N/A
5642238	12/1996	Sala	N/A	N/A
5644851	12/1996	Blank et al.	N/A	N/A
5646614	12/1996	Abersfelder et al.	N/A	N/A
5649756	12/1996	Adams et al.	N/A	N/A
5649758	12/1996	Dion	N/A	N/A
5650765	12/1996	Park	N/A	N/A
5661455	12/1996	Van Lente et al.	N/A	N/A
5662375	12/1996	Adams et al.	N/A	N/A
5666157	12/1996	Aviv	N/A	N/A
5668663	12/1996	Varaprasad et al.	N/A	N/A
5668675	12/1996	Fredricks	N/A	N/A
5669698	12/1996	Veldman et al.	N/A	N/A
5669699	12/1996	Pastrick et al.	N/A	N/A
5669704	12/1996	Pastrick	N/A	N/A
5669705	12/1996	Pastrick et al.	N/A	N/A
5670935	12/1996	Schofield et al.	N/A	N/A
5671996	12/1996	Bos et al.	N/A	N/A
5673994	12/1996	Fant, Jr. et al.	N/A	N/A
5673999	12/1996	Koenck	N/A	N/A
5680123	12/1996	Lee	N/A	N/A
5680245	12/1996	Lynam	N/A	N/A
5686975	12/1996	Lipton	N/A	N/A
5689241	12/1996	Clarke, Sr. et al.	N/A	N/A
5691848	12/1996	Van Lente et al.	N/A	N/A
5692819	12/1996	Mitsutake et al.	N/A	N/A
5699044	12/1996	Van Lente et al.	N/A	N/A
5708410	12/1997	Blank et al.	N/A	N/A
5708415	12/1997	Van Lente et al.	N/A	N/A
5708857	12/1997	Ishibashi	N/A	N/A
5715093	12/1997	Schierbeek et al.	N/A	N/A
5724187	12/1997	Varaprasad et al.	N/A	N/A
5724316	12/1997	Brunts	N/A	N/A
5729194	12/1997	Spears et al.	N/A	N/A
5737226	12/1997	Olson et al.	N/A	N/A
5741966	12/1997	Handfield et al.	N/A	N/A

5745050	12/1997	Nakagawa	N/A	N/A
5745266	12/1997	Smith	N/A	N/A
5748287	12/1997	Takahashi et al.	N/A	N/A
5751211	12/1997	Shirai et al.	N/A	N/A
5751246	12/1997	Hertel	N/A	N/A
5751390	12/1997	Crawford et al.	N/A	N/A
5751489	12/1997	Caskey et al.	N/A	N/A
5754099	12/1997	Nishimura et al.	N/A	N/A
5760828	12/1997	Cortes	N/A	N/A
5760931	12/1997	Saburi et al.	N/A	N/A
5760962	12/1997	Schofield et al.	N/A	N/A
5761094	12/1997	Olson et al.	N/A	N/A
5762823	12/1997	Hikmet	N/A	N/A
5767793	12/1997	Agravante et al.	N/A	N/A
5775762	12/1997	Vitito	N/A	N/A
5786772	12/1997	Schofield et al.	N/A	N/A
5788357	12/1997	Muth et al.	N/A	N/A
5790973	12/1997	Blaker et al.	N/A	N/A
5793308	12/1997	Rosinski et al.	N/A	N/A
5793420	12/1997	Schmidt	N/A	N/A
5796094	12/1997	Schofield et al.	N/A	N/A
5796176	12/1997	Kramer et al.	N/A	N/A
5798057	12/1997	Hikmet	N/A	N/A
5798575	12/1997	O'Farrell et al.	N/A	N/A
5798688	12/1997	Schofield	N/A	N/A
5802727	12/1997	Blank et al.	N/A	N/A
5803579	12/1997	Turnbull et al.	N/A	N/A
5805367	12/1997	Kanazawa	N/A	N/A
5806879	12/1997	Hamada et al.	N/A	N/A
5806965	12/1997	Deese	N/A	N/A
5808197	12/1997	Dao	N/A	N/A
5808566	12/1997	Behr et al.	N/A	N/A
5808589	12/1997	Fergason	N/A	N/A
5808713	12/1997	Broer et al.	N/A	N/A
5808777	12/1997	Lynam et al.	N/A	N/A
5808778	12/1997	Bauer et al.	N/A	N/A
5812321	12/1997	Schierbeek et al.	N/A	N/A
5813745	12/1997	Fant, Jr. et al.	N/A	N/A
5818625	12/1997	Forgette et al.	N/A	N/A
5820097	12/1997	Spooner	N/A	N/A
5820245	12/1997	Desmond et al.	N/A	N/A
5823654	12/1997	Pastrick et al.	N/A	N/A
5825527	12/1997	Forgette et al.	N/A	N/A
5837994	12/1997	Stam et al.	N/A	N/A
5844505	12/1997	Van Ryzin	N/A	N/A
5848373	12/1997	DeLorme et al.	N/A	N/A
5850176	12/1997	Kinoshita et al.	N/A	N/A
5863116	12/1998	Pastrick et al.	N/A	N/A
5867801	12/1998	Denny	N/A	N/A
5871275	12/1998	O'Farrell et al.	N/A	N/A

5877707	12/1998	Kowalick	N/A	N/A
5877897	12/1998	Schofield et al.	N/A	N/A
5878353	12/1998	ul Azam et al.	N/A	N/A
5878370	12/1998	Olson	N/A	N/A
5879074	12/1998	Pastrick	N/A	N/A
5883605	12/1998	Knapp	N/A	N/A
5883739	12/1998	Ashihara et al.	N/A	N/A
5888431	12/1998	Tonar et al.	N/A	N/A
5899551	12/1998	Neijzen et al.	N/A	N/A
5899956	12/1998	Chan	N/A	N/A
5904729	12/1998	Ruzicka	N/A	N/A
5910854	12/1998	Varaprasad et al.	N/A	N/A
5914815	12/1998	Bos	N/A	N/A
5917664	12/1998	O'Neill et al.	N/A	N/A
5918180	12/1998	Dimino	N/A	N/A
5923027	12/1998	Stam et al.	N/A	N/A
5923457	12/1998	Byker et al.	N/A	N/A
5924212	12/1998	Domanski	N/A	N/A
5928572	12/1998	Tonar et al.	N/A	N/A
5929786	12/1998	Schofield et al.	N/A	N/A
5938321	12/1998	Bos et al.	N/A	N/A
5938721	12/1998	Dussell et al.	N/A	N/A
5940011	12/1998	Agravante et al.	N/A	N/A
5940120	12/1998	Frankhouse et al.	N/A	N/A
5940201	12/1998	Ash et al.	N/A	N/A
5942895	12/1998	Popovic et al.	N/A	N/A
5949331	12/1998	Schofield et al.	N/A	N/A
5956079	12/1998	Ridgley	N/A	N/A
5956181	12/1998	Lin	N/A	N/A
5959367	12/1998	O'Farrell et al.	N/A	N/A
5959555	12/1998	Furuta	N/A	N/A
5959577	12/1998	Fan et al.	N/A	N/A
5963247	12/1998	Banitt	N/A	N/A
5965247	12/1998	Jonza et al.	N/A	N/A
5971552	12/1998	O'Farrell et al.	N/A	N/A
5973760	12/1998	Dehmlow	N/A	N/A
5975715	12/1998	Bauder	N/A	N/A
5984482	12/1998	Rumsey et al.	N/A	N/A
5986730	12/1998	Hansen et al.	N/A	N/A
5990469	12/1998	Bechtel et al.	N/A	N/A
5998617	12/1998	Srinivasa et al.	N/A	N/A
5998929	12/1998	Bechtel et al.	N/A	N/A
6000823	12/1998	Desmond et al.	N/A	N/A
6001486	12/1998	Varaprasad et al.	N/A	N/A
6002511	12/1998	Varaprasad et al.	N/A	N/A
6002544	12/1998	Yatsu	N/A	N/A
6007222	12/1998	Thau	N/A	N/A
6008486	12/1998	Stam et al.	N/A	N/A
6008871	12/1998	Okumura	N/A	N/A
6009359	12/1998	El-Hakim et al.	N/A	N/A

6016035	12/1999	Eberspacher et al.	N/A	N/A
6016215	12/1999	Byker	N/A	N/A
6019411	12/1999	Carter et al.	N/A	N/A
6019475	12/1999	Lynam et al.	N/A	N/A
6021371	12/1999	Fultz	N/A	N/A
6023229	12/1999	Bugno et al.	N/A	N/A
6025872	12/1999	Ozaki et al.	N/A	N/A
6037689	12/1999	Bingle et al.	N/A	N/A
6042253	12/1999	Fant, Jr. et al.	N/A	N/A
6045243	12/1999	Muth et al.	N/A	N/A
6045643	12/1999	Byker et al.	N/A	N/A
6046766	12/1999	Sakata	N/A	N/A
6046837	12/1999	Yamamoto	N/A	N/A
6049171	12/1999	Stam et al.	N/A	N/A
6060989	12/1999	Gehlot	N/A	N/A
6061002	12/1999	Weber et al.	N/A	N/A
6064508	12/1999	Forgette et al.	N/A	N/A
6065840	12/1999	Caskey et al.	N/A	N/A
6067111	12/1999	Hahn et al.	N/A	N/A
6067500	12/1999	Morimoto et al.	N/A	N/A
6072391	12/1999	Suzuki et al.	N/A	N/A
6074777	12/1999	Reimers et al.	N/A	N/A
6078355	12/1999	Zengel	N/A	N/A
6078865	12/1999	Koyanagi	N/A	N/A
6082881	12/1999	Hicks	N/A	N/A
6084700	12/1999	Knapp et al.	N/A	N/A
6086131	12/1999	Bingle et al.	N/A	N/A
6086229	12/1999	Pastrick	N/A	N/A
6087012	12/1999	Varaprasad et al.	N/A	N/A
6087953	12/1999	DeLine et al.	N/A	N/A
6094618	12/1999	Harada	N/A	N/A
6097023	12/1999	Schofield et al.	N/A	N/A
6097316	12/1999	Liaw et al.	N/A	N/A
6099131	12/1999	Fletcher et al.	N/A	N/A
6099155	12/1999	Pastrick et al.	N/A	N/A
6102559	12/1999	Nold et al.	N/A	N/A
6104552	12/1999	Thau et al.	N/A	N/A
6106121	12/1999	Buckley et al.	N/A	N/A
6111498	12/1999	Jobes, I et al.	N/A	N/A
6111683	12/1999	Cammenga et al.	N/A	N/A
6111684	12/1999	Forgette et al.	N/A	N/A
6111685	12/1999	Tench et al.	N/A	N/A
6111696	12/1999	Allen et al.	N/A	N/A
6115651	12/1999	Cruz	N/A	N/A
6116743	12/1999	Hoek	N/A	N/A
6122597	12/1999	Saneyoshi et al.	N/A	N/A
6124647	12/1999	Marcus et al.	N/A	N/A
6124886	12/1999	DeLine et al.	N/A	N/A
6127945	12/1999	Mura-Smith	N/A	N/A
6128576	12/1999	Nishimoto et al.	N/A	N/A

6130421	12/1999	Bechtel et al.	N/A	N/A
6130448	12/1999	Bauer et al.	N/A	N/A
6132072	12/1999	Turnbull et al.	N/A	N/A
6139171	12/1999	Waldmann	N/A	N/A
6139172	12/1999	Bos et al.	N/A	N/A
6140933	12/1999	Bugno et al.	N/A	N/A
6146003	12/1999	Thau	N/A	N/A
6148261	12/1999	Obradovich et al.	N/A	N/A
6149287	12/1999	Pastrick et al.	N/A	N/A
6150014	12/1999	Chu et al.	N/A	N/A
6151065	12/1999	Steed et al.	N/A	N/A
6151539	12/1999	Bergholz et al.	N/A	N/A
6152590	12/1999	Furst et al.	N/A	N/A
6154149	12/1999	Tyckowski et al.	N/A	N/A
6154306	12/1999	Varaprasad et al.	N/A	N/A
6157294	12/1999	Urai et al.	N/A	N/A
6158655	12/1999	DeVries, Jr. et al.	N/A	N/A
6161865	12/1999	Rose et al.	N/A	N/A
6166625	12/1999	Teowee et al.	N/A	N/A
6166629	12/1999	Hamma et al.	N/A	N/A
6166847	12/1999	Tench et al.	N/A	N/A
6166848	12/1999	Cammenga et al.	N/A	N/A
6167755	12/2000	Damson et al.	N/A	N/A
6169955	12/2000	Fultz	N/A	N/A
6170956	12/2000	Rumsey et al.	N/A	N/A
6172600	12/2000	Kakinami et al.	N/A	N/A
6172601	12/2000	Wada et al.	N/A	N/A
6172613	12/2000	DeLine et al.	N/A	N/A
6173501	12/2000	Blank et al.	N/A	N/A
6175164	12/2000	O'Farrell et al.	N/A	N/A
6175300	12/2000	Kendrick	N/A	N/A
6176602	12/2000	Pastrick et al.	N/A	N/A
6178034	12/2000	Allemand et al.	N/A	N/A
6178377	12/2000	Ishihara et al.	N/A	N/A
6182006	12/2000	Meek	N/A	N/A
6183119	12/2000	Desmond et al.	N/A	N/A
6184679	12/2000	Popovic et al.	N/A	N/A
6184781	12/2000	Ramakesavan	N/A	N/A
6185492	12/2000	Kagawa et al.	N/A	N/A
6185501	12/2000	Smith et al.	N/A	N/A
6188505	12/2000	Lomprey et al.	N/A	N/A
6191704	12/2000	Takenaga et al.	N/A	N/A
6196688	12/2000	Caskey et al.	N/A	N/A
6198409	12/2000	Schofield et al.	N/A	N/A
6199014	12/2000	Walker et al.	N/A	N/A
6200010	12/2000	Anders	N/A	N/A
6201642	12/2000	Bos	N/A	N/A
6210008	12/2000	Hoekstra et al.	N/A	N/A
6210012	12/2000	Broer	N/A	N/A
6212470	12/2000	Seymour et al.	N/A	N/A

6217181	12/2000	Lynam et al.	N/A	N/A
6218934	12/2000	Regan	N/A	N/A
6222447	12/2000	Schofield et al.	N/A	N/A
6222460	12/2000	DeLine et al.	N/A	N/A
6227689	12/2000	Miller	N/A	N/A
6232937	12/2000	Jacobsen et al.	N/A	N/A
6239851	12/2000	Hatazawa et al.	N/A	N/A
6239898	12/2000	Byker et al.	N/A	N/A
6243003	12/2000	DeLine et al.	N/A	N/A
6245262	12/2000	Varaprasad et al.	N/A	N/A
6249214	12/2000	Kashiwazaki	N/A	N/A
6250148	12/2000	Lynam	N/A	N/A
6250766	12/2000	Strumolo et al.	N/A	N/A
6250783	12/2000	Stidham et al.	N/A	N/A
6255639	12/2000	Stam et al.	N/A	N/A
6257746	12/2000	Todd et al.	N/A	N/A
6259412	12/2000	Duroux	N/A	N/A
6259475	12/2000	Ramachandran et al.	N/A	N/A
6265968	12/2000	Betzitza et al.	N/A	N/A
6268803	12/2000	Gunderson et al.	N/A	N/A
6269308	12/2000	Kodaka et al.	N/A	N/A
6274221	12/2000	Smith et al.	N/A	N/A
6276821	12/2000	Pastrick et al.	N/A	N/A
6276822	12/2000	Bedrosian et al.	N/A	N/A
6277471	12/2000	Tang	N/A	N/A
6278271	12/2000	Schott	N/A	N/A
6278377	12/2000	DeLine et al.	N/A	N/A
6278941	12/2000	Yokoyama	N/A	N/A
6280068	12/2000	Mertens et al.	N/A	N/A
6280069	12/2000	Pastrick et al.	N/A	N/A
6281804	12/2000	Haller et al.	N/A	N/A
6286965	12/2000	Caskey et al.	N/A	N/A
6286984	12/2000	Berg	N/A	N/A
6289332	12/2000	Menig et al.	N/A	N/A
6290378	12/2000	Buchalla et al.	N/A	N/A
6291906	12/2000	Marcus et al.	N/A	N/A
6294989	12/2000	Schofield et al.	N/A	N/A
6296379	12/2000	Pastrick	N/A	N/A
6297781	12/2000	Turnbull et al.	N/A	N/A
6299333	12/2000	Pastrick et al.	N/A	N/A
6300879	12/2000	Regan et al.	N/A	N/A
6304173	12/2000	Pala et al.	N/A	N/A
6305807	12/2000	Schierbeek	N/A	N/A
6310611	12/2000	Caldwell	N/A	N/A
6310714	12/2000	Lomprey et al.	N/A	N/A
6310738	12/2000	Chu	N/A	N/A
6313454	12/2000	Bos et al.	N/A	N/A
6314295	12/2000	Kawamoto	N/A	N/A
6317057	12/2000	Lee	N/A	N/A
6317248	12/2000	Agrawal et al.	N/A	N/A

6318870	12/2000	Spooner et al.	N/A	N/A
6320176	12/2000	Schofield et al.	N/A	N/A
6320282	12/2000	Caldwell	N/A	N/A
6320612	12/2000	Young	N/A	N/A
6324295	12/2000	Valery et al.	N/A	N/A
6326613	12/2000	Heslin et al.	N/A	N/A
6326900	12/2000	DeLine et al.	N/A	N/A
6329925	12/2000	Skiver et al.	N/A	N/A
6330511	12/2000	Ogura et al.	N/A	N/A
6331066	12/2000	Desmond et al.	N/A	N/A
6333759	12/2000	Mazzilli	N/A	N/A
6335680	12/2001	Matsuoka	N/A	N/A
6336737	12/2001	Thau	N/A	N/A
6341523	12/2001	Lynam	N/A	N/A
6344805	12/2001	Yasui et al.	N/A	N/A
6346698	12/2001	Turnbull	N/A	N/A
6347880	12/2001	Furst et al.	N/A	N/A
6348858	12/2001	Weis et al.	N/A	N/A
6351708	12/2001	Takagi et al.	N/A	N/A
6353392	12/2001	Schofield et al.	N/A	N/A
6356206	12/2001	Takenaga et al.	N/A	N/A
6356376	12/2001	Tonar et al.	N/A	N/A
6356389	12/2001	Nilsen et al.	N/A	N/A
6357883	12/2001	Strumolo et al.	N/A	N/A
6362548	12/2001	Bingle et al.	N/A	N/A
6363326	12/2001	Scully	N/A	N/A
6366213	12/2001	DeLine et al.	N/A	N/A
6370329	12/2001	Teuchert	N/A	N/A
6371636	12/2001	Wesson	N/A	N/A
6386742	12/2001	DeLine et al.	N/A	N/A
6390529	12/2001	Bingle et al.	N/A	N/A
6390635	12/2001	Whitehead et al.	N/A	N/A
6396397	12/2001	Bos et al.	N/A	N/A
6396637	12/2001	Roest et al.	N/A	N/A
6407847	12/2001	Poll et al.	N/A	N/A
6408247	12/2001	Ichikawa et al.	N/A	N/A
6411204	12/2001	Bloomfield et al.	N/A	N/A
6412959	12/2001	Tseng	N/A	N/A
6412973	12/2001	Bos et al.	N/A	N/A
6415230	12/2001	Maruko et al.	N/A	N/A
6416208	12/2001	Pastrick et al.	N/A	N/A
6417786	12/2001	Learman et al.	N/A	N/A
6418376	12/2001	Olson	N/A	N/A
6419300	12/2001	Pavao et al.	N/A	N/A
6420036	12/2001	Varaprasad et al.	N/A	N/A
6420975	12/2001	DeLine et al.	N/A	N/A
6421081	12/2001	Markus	N/A	N/A
6424272	12/2001	Gutta et al.	N/A	N/A
6424273	12/2001	Gutta et al.	N/A	N/A
6424892	12/2001	Matsuoka	N/A	N/A

6426492	12/2001	Bos et al.	N/A	N/A
6427349	12/2001	Blank et al.	N/A	N/A
6428172	12/2001	Hutzel et al.	N/A	N/A
6433676	12/2001	DeLine et al.	N/A	N/A
6433680	12/2001	Ho	N/A	N/A
6433914	12/2001	Lomprey et al.	N/A	N/A
6437688	12/2001	Kobayashi	N/A	N/A
6438491	12/2001	Farmer	N/A	N/A
6439755	12/2001	Fant, Jr. et al.	N/A	N/A
6441872	12/2001	Ho	N/A	N/A
6445287	12/2001	Schofield et al.	N/A	N/A
6447128	12/2001	Lang et al.	N/A	N/A
6452533	12/2001	Yamabuchi et al.	N/A	N/A
6463369	12/2001	Sadano et al.	N/A	N/A
6466701	12/2001	Ejiri et al.	N/A	N/A
6472977	12/2001	Pochmuller	N/A	N/A
6473001	12/2001	Blum	N/A	N/A
6474853	12/2001	Pastrick et al.	N/A	N/A
6476731	12/2001	Miki et al.	N/A	N/A
6477460	12/2001	Kepler	N/A	N/A
6477464	12/2001	McCarthy et al.	N/A	N/A
6483429	12/2001	Yasui et al.	N/A	N/A
6483438	12/2001	DeLine et al.	N/A	N/A
6487500	12/2001	Lemelson et al.	N/A	N/A
6494602	12/2001	Pastrick et al.	N/A	N/A
6498620	12/2001	Schofield et al.	N/A	N/A
6501387	12/2001	Skiver et al.	N/A	N/A
6512624	12/2002	Tonar et al.	N/A	N/A
6513252	12/2002	Schierbeek et al.	N/A	N/A
6515581	12/2002	Ho	N/A	N/A
6515582	12/2002	Teowee et al.	N/A	N/A
6515597	12/2002	Wada et al.	N/A	N/A
6516664	12/2002	Lynam	N/A	N/A
6520667	12/2002	Mousseau	N/A	N/A
6522451	12/2002	Lynam	N/A	N/A
6522969	12/2002	Kannonji	N/A	N/A
6534884	12/2002	Marcus et al.	N/A	N/A
6539306	12/2002	Turnbull	N/A	N/A
6542085	12/2002	Yang	N/A	N/A
6542182	12/2002	Chutorash	N/A	N/A
6545598	12/2002	de Villeroche	N/A	N/A
6549335	12/2002	Trapani et al.	N/A	N/A
6550949	12/2002	Bauer et al.	N/A	N/A
6553308	12/2002	Uhlmann et al.	N/A	N/A
6568839	12/2002	Pastrick et al.	N/A	N/A
6572233	12/2002	Northman et al.	N/A	N/A
6575643	12/2002	Takahashi	N/A	N/A
6580373	12/2002	Ohashi	N/A	N/A
6581007	12/2002	Hasegawa et al.	N/A	N/A
6583730	12/2002	Lang et al.	N/A	N/A

6591192	12/2002	Okamura et al.	N/A	N/A
6593565	12/2002	Heslin et al.	N/A	N/A
6593984	12/2002	Arakawa et al.	N/A	N/A
6594065	12/2002	Byker et al.	N/A	N/A
6594067	12/2002	Poll et al.	N/A	N/A
6594090	12/2002	Kruschwitz et al.	N/A	N/A
6594583	12/2002	Ogura et al.	N/A	N/A
6594614	12/2002	Studt et al.	N/A	N/A
6597489	12/2002	Guarr et al.	N/A	N/A
6611202	12/2002	Schofield et al.	N/A	N/A
6611227	12/2002	Nebiyeloul-Kifle et al.	N/A	N/A
6611759	12/2002	Brosche	N/A	N/A
6614387	12/2002	Deadman	N/A	N/A
6616313	12/2002	Furst et al.	N/A	N/A
6616764	12/2002	Kramer et al.	N/A	N/A
6618672	12/2002	Sasaki et al.	N/A	N/A
6624936	12/2002	Kotchick et al.	N/A	N/A
6627918	12/2002	Getz et al.	N/A	N/A
6630888	12/2002	Lang et al.	N/A	N/A
6636258	12/2002	Strumolo	N/A	N/A
6638582	12/2002	Uchiyama et al.	N/A	N/A
6642840	12/2002	Lang et al.	N/A	N/A
6642851	12/2002	Deline et al.	N/A	N/A
6648477	12/2002	Hutzel et al.	N/A	N/A
6657708	12/2002	Drevillon et al.	N/A	N/A
6661830	12/2002	Reed et al.	N/A	N/A
6665592	12/2002	Kodama	N/A	N/A
6670207	12/2002	Roberts	N/A	N/A
6670910	12/2002	Delcheccolo et al.	N/A	N/A
6671080	12/2002	Poll et al.	N/A	N/A
6672731	12/2003	Schnell et al.	N/A	N/A
6672734	12/2003	Lammers	N/A	N/A
6672744	12/2003	DeLine et al.	N/A	N/A
6672745	12/2003	Bauer et al.	N/A	N/A
6674370	12/2003	Rodewald et al.	N/A	N/A
6675075	12/2003	Engelsberg et al.	N/A	N/A
6678083	12/2003	Anstee	N/A	N/A
6678614	12/2003	McCarthy et al.	N/A	N/A
6683539	12/2003	Trajkovic et al.	N/A	N/A
6683969	12/2003	Nishigaki et al.	N/A	N/A
6685348	12/2003	Pastrick et al.	N/A	N/A
6690268	12/2003	Schofield et al.	N/A	N/A
6690413	12/2003	Moore	N/A	N/A
6693517	12/2003	McCarthy et al.	N/A	N/A
6693518	12/2003	Kumata et al.	N/A	N/A
6693519	12/2003	Keirstead	N/A	N/A
6693524	12/2003	Payne	N/A	N/A
6700692	12/2003	Tonar et al.	N/A	N/A
6709136	12/2003	Pastrick et al.	N/A	N/A
6717610	12/2003	Bos et al.	N/A	N/A

6717712	12/2003	Lynam et al.	N/A	N/A
6726337	12/2003	Whitehead et al.	N/A	N/A
6727808	12/2003	Uselmann et al.	N/A	N/A
6727844	12/2003	Zimmermann et al.	N/A	N/A
6731332	12/2003	Yasui et al.	N/A	N/A
6734807	12/2003	King	N/A	N/A
6736526	12/2003	Matsuba et al.	N/A	N/A
6737964	12/2003	Samman et al.	N/A	N/A
6738088	12/2003	Uskolovsky et al.	N/A	N/A
6744353	12/2003	Sjonell	N/A	N/A
6748211	12/2003	Isaac et al.	N/A	N/A
6756912	12/2003	Skiver et al.	N/A	N/A
6757109	12/2003	Bos	N/A	N/A
6759113	12/2003	Tang	N/A	N/A
6760157	12/2003	Allen et al.	N/A	N/A
6774356	12/2003	Heslin et al.	N/A	N/A
6774810	12/2003	DeLine et al.	N/A	N/A
6778904	12/2003	Iwami et al.	N/A	N/A
6784129	12/2003	Seto et al.	N/A	N/A
6797396	12/2003	Liu et al.	N/A	N/A
6800871	12/2003	Matsuda et al.	N/A	N/A
6801283	12/2003	Koyama et al.	N/A	N/A
6806452	12/2003	Bos et al.	N/A	N/A
6810323	12/2003	Bullock et al.	N/A	N/A
6824281	12/2003	Schofield et al.	N/A	N/A
6832848	12/2003	Pastrick	N/A	N/A
6836725	12/2003	Millington et al.	N/A	N/A
6842276	12/2004	Poll et al.	N/A	N/A
6846098	12/2004	Bourdelais et al.	N/A	N/A
6847487	12/2004	Burgner	N/A	N/A
6848817	12/2004	Bos et al.	N/A	N/A
6853491	12/2004	Ruhle et al.	N/A	N/A
6870655	12/2004	Northman et al.	N/A	N/A
6870656	12/2004	Tonar et al.	N/A	N/A
6871982	12/2004	Holman et al.	N/A	N/A
6877888	12/2004	DeLine et al.	N/A	N/A
6882287	12/2004	Schofield	N/A	N/A
6891563	12/2004	Schofield et al.	N/A	N/A
6902284	12/2004	Hutzel et al.	N/A	N/A
6906632	12/2004	DeLine et al.	N/A	N/A
6912396	12/2004	Sziraki et al.	N/A	N/A
6922902	12/2004	Schierbeek et al.	N/A	N/A
6928180	12/2004	Stam et al.	N/A	N/A
6928366	12/2004	Ockerse et al.	N/A	N/A
6930737	12/2004	Weindorf et al.	N/A	N/A
6934067	12/2004	Ash et al.	N/A	N/A
6946978	12/2004	Schofield	N/A	N/A
6947576	12/2004	Stam et al.	N/A	N/A
6947577	12/2004	Stam et al.	N/A	N/A
6951410	12/2004	Parsons	N/A	N/A

6951681	12/2004	Hartley et al.	N/A	N/A
6952312	12/2004	Weber et al.	N/A	N/A
6968273	12/2004	Ockerse et al.	N/A	N/A
6972888	12/2004	Poll et al.	N/A	N/A
6974236	12/2004	Tenmyo	N/A	N/A
6975215	12/2004	Schofield et al.	N/A	N/A
6977702	12/2004	Wu	N/A	N/A
6980092	12/2004	Turnbull et al.	N/A	N/A
6985291	12/2005	Watson et al.	N/A	N/A
6992718	12/2005	Takahara	N/A	N/A
7001058	12/2005	Inditsky	N/A	N/A
7004592	12/2005	Varaprasad et al.	N/A	N/A
7004593	12/2005	Weller et al.	N/A	N/A
7006173	12/2005	Hiyama et al.	N/A	N/A
7009751	12/2005	Tonar et al.	N/A	N/A
7012543	12/2005	DeLine et al.	N/A	N/A
7041965	12/2005	Heslin et al.	N/A	N/A
7042616	12/2005	Tonar et al.	N/A	N/A
7046418	12/2005	Lin et al.	N/A	N/A
7046448	12/2005	Burgner	N/A	N/A
7057681	12/2005	Hinata et al.	N/A	N/A
7092052	12/2005	Okamoto et al.	N/A	N/A
7108409	12/2005	DeLine et al.	N/A	N/A
7125131	12/2005	Olczak	N/A	N/A
7132064	12/2005	Li et al.	N/A	N/A
7149613	12/2005	Stam et al.	N/A	N/A
7151997	12/2005	Uhlmann et al.	N/A	N/A
7154657	12/2005	Poll et al.	N/A	N/A
7158881	12/2006	McCarthy et al.	N/A	N/A
7160017	12/2006	Lee et al.	N/A	N/A
7167796	12/2006	Taylor et al.	N/A	N/A
7175291	12/2006	Li	N/A	N/A
7184190	12/2006	McCabe et al.	N/A	N/A
7188963	12/2006	Schofield et al.	N/A	N/A
7193764	12/2006	Lin et al.	N/A	N/A
7195381	12/2006	Lynam et al.	N/A	N/A
7199767	12/2006	Spero	N/A	N/A
7209277	12/2006	Tonar et al.	N/A	N/A
7215473	12/2006	Fleming	N/A	N/A
7245336	12/2006	Hiyama et al.	N/A	N/A
7251079	12/2006	Capaldo et al.	N/A	N/A
7255451	12/2006	McCabe et al.	N/A	N/A
7255465	12/2006	DeLine et al.	N/A	N/A
7262406	12/2006	Heslin et al.	N/A	N/A
7262916	12/2006	Kao et al.	N/A	N/A
7265342	12/2006	Heslin et al.	N/A	N/A
7268841	12/2006	Kasajima et al.	N/A	N/A
7269327	12/2006	Tang	N/A	N/A
7269328	12/2006	Tang	N/A	N/A
7274501	12/2006	McCabe et al.	N/A	N/A

7286280	12/2006	Whitehead et al.	N/A	N/A
7290919	12/2006	Pan et al.	N/A	N/A
7292208	12/2006	Park et al.	N/A	N/A
7308341	12/2006	Schofield et al.	N/A	N/A
7310177	12/2006	McCabe et al.	N/A	N/A
7311428	12/2006	DeLine et al.	N/A	N/A
7323819	12/2007	Hong et al.	N/A	N/A
7324261	12/2007	Tonar et al.	N/A	N/A
7328103	12/2007	McCarthy et al.	N/A	N/A
7329013	12/2007	Blank et al.	N/A	N/A
7338177	12/2007	Lynam	N/A	N/A
7344284	12/2007	Lynam et al.	N/A	N/A
7349143	12/2007	Tonar et al.	N/A	N/A
7362505	12/2007	Hikmet et al.	N/A	N/A
7370983	12/2007	DeWind et al.	N/A	N/A
7372611	12/2007	Tonar et al.	N/A	N/A
7379224	12/2007	Tonar et al.	N/A	N/A
7379225	12/2007	Tonar et al.	N/A	N/A
7379243	12/2007	Horsten et al.	N/A	N/A
7411732	12/2007	Kao et al.	N/A	N/A
7412328	12/2007	Uhlmann et al.	N/A	N/A
7417781	12/2007	Tonar et al.	N/A	N/A
7420159	12/2007	Heslin et al.	N/A	N/A
7446462	12/2007	Lim et al.	N/A	N/A
7446650	12/2007	Scholfield et al.	N/A	N/A
7448776	12/2007	Tang	N/A	N/A
7452090	12/2007	Weller et al.	N/A	N/A
7467883	12/2007	DeLine et al.	N/A	N/A
7468651	12/2007	DeLine et al.	N/A	N/A
7471438	12/2007	McCabe et al.	N/A	N/A
7477439	12/2008	Tonar et al.	N/A	N/A
7480149	12/2008	DeWard et al.	N/A	N/A
7488080	12/2008	Skiver et al.	N/A	N/A
7490007	12/2008	Taylor et al.	N/A	N/A
7490943	12/2008	Kikuchi et al.	N/A	N/A
7490944	12/2008	Blank et al.	N/A	N/A
7494231	12/2008	Varaprasad et al.	N/A	N/A
7502156	12/2008	Tonar et al.	N/A	N/A
7510287	12/2008	Hook	N/A	N/A
7511872	12/2008	Tonar et al.	N/A	N/A
7526103	12/2008	Schofield et al.	N/A	N/A
7538316	12/2008	Heslin et al.	N/A	N/A
7540620	12/2008	Weller et al.	N/A	N/A
7547467	12/2008	Olson et al.	N/A	N/A
7551354	12/2008	Horsten et al.	N/A	N/A
7571042	12/2008	Taylor et al.	N/A	N/A
7572490	12/2008	Park et al.	N/A	N/A
7580795	12/2008	McCarthy et al.	N/A	N/A
7581867	12/2008	Lee et al.	N/A	N/A
7586566	12/2008	Nelson et al.	N/A	N/A

7586666	12/2008	McCabe et al.	N/A	N/A
7619508	12/2008	Lynam et al.	N/A	N/A
7626749	12/2008	Baur et al.	N/A	N/A
7633567	12/2008	Yamada et al.	N/A	N/A
7658521	12/2009	DeLine et al.	N/A	N/A
7667579	12/2009	DeLine et al.	N/A	N/A
7695174	12/2009	Takayanagi et al.	N/A	N/A
7711479	12/2009	Taylor et al.	N/A	N/A
9487144	12/2015	Blank et al.	N/A	N/A
9609757	12/2016	Steigerwald	N/A	N/A
10128595	12/2017	Conger et al.	N/A	N/A
10264219	12/2018	Mleczko et al.	N/A	N/A
10298823	12/2018	Sauer et al.	N/A	N/A
10313572	12/2018	Wohlte	N/A	N/A
10567705	12/2019	Ziegenspeck et al.	N/A	N/A
10583782	12/2019	Blank et al.	N/A	N/A
11021107	12/2020	Blank et al.	N/A	N/A
11577652	12/2022	Blank et al.	N/A	N/A
11807164	12/2022	Blank et al.	N/A	N/A
12054098	12/2023	Blank et al.	N/A	N/A
2001/0019356	12/2000	Takeda et al.	N/A	N/A
2001/0022616	12/2000	Rademacher et al.	N/A	N/A
2001/0026215	12/2000	Nakaho et al.	N/A	N/A
2001/0026316	12/2000	Senatore	N/A	N/A
2001/0030857	12/2000	Futhey et al.	N/A	N/A
2001/0045981	12/2000	Gloger et al.	N/A	N/A
2002/0003571	12/2001	Schofield et al.	N/A	N/A
2002/0044065	12/2001	Quist et al.	N/A	N/A
2002/0049535	12/2001	Rigo et al.	N/A	N/A
2002/0072026	12/2001	Lynam et al.	N/A	N/A
2002/0085155	12/2001	Arikawa	N/A	N/A
2002/0093826	12/2001	Bos et al.	N/A	N/A
2002/0113203	12/2001	Heslin et al.	N/A	N/A
2002/0126497	12/2001	Pastrick	N/A	N/A
2002/0154007	12/2001	Yang	N/A	N/A
2002/0159270	12/2001	Lynam	362/492	B60Q 3/74
2002/0172053	12/2001	Pastrick et al.	N/A	N/A
2002/0191409	12/2001	Deline et al.	N/A	N/A
2002/0196639	12/2001	Weidel	N/A	N/A
2003/0002165	12/2002	Mathias et al.	N/A	N/A
2003/0002179	12/2002	Roberts et al.	N/A	N/A
2003/0007261	12/2002	Hutzel et al.	N/A	N/A
2003/0016125	12/2002	Lang et al.	N/A	N/A
2003/0016287	12/2002	Nakayama et al.	N/A	N/A
2003/0016542	12/2002	Pastrick et al.	N/A	N/A
2003/0020603	12/2002	DeLine et al.	N/A	N/A
2003/0025596	12/2002	Lang et al.	N/A	N/A
2003/0025597	12/2002	Schofield	N/A	N/A
2003/0030546	12/2002	Tseng	N/A	N/A
2003/0030551	12/2002	Ho	N/A	N/A

2003/0030724	12/2002	Okamoto	N/A	N/A
2003/0035050	12/2002	Mizusawa et al.	N/A	N/A
2003/0043269	12/2002	Park	N/A	N/A
2003/0048639	12/2002	Boyd et al.	N/A	N/A
2003/0052969	12/2002	Satoh et al.	N/A	N/A
2003/0058338	12/2002	Kawauchi et al.	N/A	N/A
2003/0067383	12/2002	Yang	N/A	N/A
2003/0069690	12/2002	Correia et al.	N/A	N/A
2003/0076415	12/2002	Strumolo	N/A	N/A
2003/0080877	12/2002	Takagi et al.	N/A	N/A
2003/0085806	12/2002	Samman et al.	N/A	N/A
2003/0088361	12/2002	Sekiguchi	N/A	N/A
2003/0090568	12/2002	Pico	N/A	N/A
2003/0090569	12/2002	Poechmueller	N/A	N/A
2003/0090570	12/2002	Takagi et al.	N/A	N/A
2003/0095331	12/2002	Bengoechea et al.	N/A	N/A
2003/0098908	12/2002	Misaiji et al.	N/A	N/A
2003/0103141	12/2002	Bechtel et al.	N/A	N/A
2003/0103142	12/2002	Hitomi et al.	N/A	N/A
2003/0117522	12/2002	Okada	N/A	N/A
2003/0117728	12/2002	Hutzel et al.	N/A	N/A
2003/0122929	12/2002	Minaudo et al.	N/A	N/A
2003/0122930	12/2002	Schofield et al.	N/A	N/A
2003/0133014	12/2002	Mendoza	N/A	N/A
2003/0137586	12/2002	Lewellen	N/A	N/A
2003/0141965	12/2002	Gunderson et al.	N/A	N/A
2003/0146831	12/2002	Berberich et al.	N/A	N/A
2003/0147244	12/2002	Tenmyo	N/A	N/A
2003/0169158	12/2002	Paul	N/A	N/A
2003/0169522	12/2002	Schofield et al.	N/A	N/A
2003/0179293	12/2002	Oizumi	N/A	N/A
2003/0189754	12/2002	Sugino et al.	N/A	N/A
2003/0202096	12/2002	Kim	N/A	N/A
2003/0210369	12/2002	Wu	N/A	N/A
2003/0214576	12/2002	Koga	N/A	N/A
2003/0214584	12/2002	Ross	N/A	N/A
2003/0214733	12/2002	Fujikawa et al.	N/A	N/A
2003/0222793	12/2002	Tanaka et al.	N/A	N/A
2003/0222983	12/2002	Nobori et al.	N/A	N/A
2003/0227546	12/2002	Hilborn et al.	N/A	N/A
2004/0004541	12/2003	Hong	N/A	N/A
2004/0027695	12/2003	Lin	N/A	N/A
2004/0032321	12/2003	McMahon et al.	N/A	N/A
2004/0032675	12/2003	Weller et al.	N/A	N/A
2004/0032676	12/2003	Drummond	359/877	G02B 27/01
2004/0036768	12/2003	Green	N/A	N/A
2004/0046870	12/2003	Leigh Travis	N/A	N/A
2004/0051634	12/2003	Schofield et al.	N/A	N/A
2004/0056955	12/2003	Berberich et al.	N/A	N/A
2004/0057131	12/2003	Hutzel et al.	N/A	N/A

2004/0064241	12/2003	Sekiguchi	N/A	N/A
2004/0066285	12/2003	Sekiguchi	N/A	N/A
2004/0075603	12/2003	Kodama	N/A	N/A
2004/0077359	12/2003	Bernas et al.	N/A	N/A
2004/0080404	12/2003	White	N/A	N/A
2004/0080431	12/2003	White	N/A	N/A
2004/0085196	12/2003	Miller et al.	N/A	N/A
2004/0085499	12/2003	Baek	N/A	N/A
2004/0090314	12/2003	Iwamoto	N/A	N/A
2004/0090317	12/2003	Rothkop	N/A	N/A
2004/0096082	12/2003	Nakai et al.	N/A	N/A
2004/0098196	12/2003	Sekiguchi	N/A	N/A
2004/0105614	12/2003	Kobayashi et al.	N/A	N/A
2004/0107030	12/2003	Nishira et al.	N/A	N/A
2004/0107617	12/2003	Shoen et al.	N/A	N/A
2004/0109060	12/2003	Ishii	N/A	N/A
2004/0114039	12/2003	Ishikura	N/A	N/A
2004/0128065	12/2003	Taylor et al.	N/A	N/A
2004/0145457	12/2003	Schofield et al.	N/A	N/A
2004/0170008	12/2003	Tenmyo	N/A	N/A
2004/0202001	12/2003	Roberts et al.	N/A	N/A
2004/0243303	12/2003	Padmanabhan	N/A	N/A
2004/0251804	12/2003	McCullough et al.	N/A	N/A
2005/0024591	12/2004	Lian et al.	N/A	N/A
2005/0024729	12/2004	Ockerse et al.	N/A	N/A
2005/0078347	12/2004	Lin et al.	N/A	N/A
2005/0078389	12/2004	Kulas et al.	N/A	N/A
2005/0079326	12/2004	Varaprasad et al.	N/A	N/A
2005/0083577	12/2004	Varaprasad et al.	N/A	N/A
2005/0084658	12/2004	Adams et al.	N/A	N/A
2005/0099559	12/2004	Lee et al.	N/A	N/A
2005/0111070	12/2004	Lin et al.	N/A	N/A
2005/0140855	12/2004	Utsumi et al.	N/A	N/A
2005/0168995	12/2004	Kittelmann et al.	N/A	N/A
2005/0169003	12/2004	Lindahl et al.	N/A	N/A
2005/0172504	12/2004	Ohm et al.	N/A	N/A
2005/0185278	12/2004	Horsten et al.	N/A	N/A
2005/0237440	12/2004	Sugimura et al.	N/A	N/A
2005/0270766	12/2004	Kung et al.	N/A	N/A
2005/0270798	12/2004	Lee et al.	N/A	N/A
2006/0007550	12/2005	Tonar et al.	N/A	N/A
2006/0028730	12/2005	V. Varaprasad et al.	N/A	N/A
2006/0038668	12/2005	DeWard et al.	N/A	N/A
2006/0050018	12/2005	Hutzel et al.	N/A	N/A
2006/0061008	12/2005	Karner et al.	N/A	N/A
2006/0139953	12/2005	Chou et al.	N/A	N/A
2006/0164230	12/2005	DeWind et al.	N/A	N/A
2006/0164725	12/2005	Horsten et al.	N/A	N/A
2006/0202111	12/2005	Heslin et al.	N/A	N/A
2006/0255960	12/2005	Uken et al.	N/A	N/A

2006/0274218	12/2005	Xue	N/A	N/A
2007/0041096	12/2006	Nieuwkerk et al.	N/A	N/A
2007/0058257	12/2006	Lynam	N/A	N/A
2007/0080585	12/2006	Lyu	N/A	N/A
2007/0118287	12/2006	Taylor et al.	N/A	N/A
2007/0120043	12/2006	Heslin et al.	N/A	N/A
2007/0132567	12/2006	Schofield et al.	N/A	N/A
2007/0162229	12/2006	McCarthy et al.	N/A	N/A
2007/0171037	12/2006	Schofield et al.	N/A	N/A
2007/0183066	12/2006	Varaprasad et al.	N/A	N/A
2007/0184284	12/2006	Varaprasad et al.	N/A	N/A
2008/0002106	12/2007	Van De Witte et al.	N/A	N/A
2008/0013153	12/2007	McCabe et al.	N/A	N/A
2008/0068520	12/2007	Minikey et al.	N/A	N/A
2008/0094684	12/2007	Varaprasad et al.	N/A	N/A
2008/0094685	12/2007	Varaprasad et al.	N/A	N/A
2008/0180529	12/2007	Taylor	348/148	B60Q 9/00
2008/0180779	12/2007	McCabe	359/267	B60Q 1/34
2008/0180781	12/2007	Varaprasad et al.	N/A	N/A
2008/0183355	12/2007	Taylor et al.	N/A	N/A
2008/0201075	12/2007	Taylor et al.	N/A	N/A
2008/0212189	12/2007	Baur	359/872	B60R 1/1207
2008/0212215	12/2007	Schofield et al.	N/A	N/A
2008/0225538	12/2007	Lynam et al.	N/A	N/A
2008/0266389	12/2007	DeWind	345/636	B60K 35/211
2008/0291522	12/2007	Varaprasad et al.	N/A	N/A
2008/0308219	12/2007	Lynam	N/A	N/A
2009/0015736	12/2008	Weller	362/494	B60R 1/10
2009/0033837	12/2008	Molsen et al.	N/A	N/A
2009/0040465	12/2008	Conner et al.	N/A	N/A
2009/0040588	12/2008	Tonar et al.	N/A	N/A
2009/0040778	12/2008	Takayanagi et al.	N/A	N/A
2009/0052003	12/2008	Schofield et al.	N/A	N/A
2009/0080055	12/2008	Baur et al.	N/A	N/A
2009/0096937	12/2008	Bauer et al.	N/A	N/A
2009/0141331	12/2008	Skiver et al.	N/A	N/A
2009/0174776	12/2008	Taylor et al.	N/A	N/A
2009/0201137	12/2008	Weller et al.	N/A	N/A
2009/0219394	12/2008	Heslin et al.	N/A	N/A
2009/0231741	12/2008	Weller et al.	N/A	N/A
2009/0243824	12/2008	Peterson	348/148	G06F 3/04886
2009/0262422	12/2008	Cross et al.	N/A	N/A
2009/0290369	12/2008	Schofield	362/494	B60S 1/0822
2010/0085645	12/2009	Skiver et al.	N/A	N/A
2010/0091509	12/2009	DeLine et al.	N/A	N/A
2010/0201816	12/2009	Lee et al.	N/A	N/A
2014/0218529	12/2013	Mahmoud et al.	N/A	N/A
2014/0218535	12/2013	Ihlenburg et al.	N/A	N/A

FOREIGN PATENT DOCUMENTS

Patent No.	Application Date	Country	CPC
2001064481	12/2000	WO	N/A

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Background/Summary

CROSS REFERENCE TO RELATED APPLICATIONS (1) The present application is a continuation of U.S. patent application Ser. No. 18/502,129, filed Nov. 6, 2023, now U.S. Pat. No. 12,054,098, which is a continuation of U.S. patent application Ser. No. 18/167,930, filed Feb. 13, 2023, now U.S. Pat. No. 11,807,164, which is a continuation of U.S. patent application Ser. No. 17/303,404, filed May 28, 2021, now U.S. Pat. No. 11,577,652, which is a continuation of U.S. patent application Ser. No. 16/812,864, filed Mar. 9, 2020, now U.S. Pat. No. 11,021,107, which is a continuation of U.S. patent application Ser. No. 15/344,865, filed Nov. 7, 2016, now U.S. Pat. No. 10,583,782, which is a continuation of U.S. patent application Ser. No. 12/578,732, filed Oct. 14, 2009, now U.S. Pat. No. 9,487,144, which claims benefit of U.S. provisional applications, Ser. No. 61/219,214, filed Jun. 22, 2009, Ser. No. 61/187,069, filed Jun. 15, 2009, Ser. No. 61/117,301, filed Nov. 24, 2008, and Ser. No. 61/105,903, filed Oct. 16, 2008, which are hereby incorporated herein by reference in their entireties.

FIELD OF THE INVENTION

(1) The present invention relates generally to the field of interior rearview mirror systems for vehicles and, more particularly, to interior rearview mirror systems which incorporate a display.

BACKGROUND OF THE INVENTION

(2) It is known to provide a video display screen at an interior rearview mirror assembly of a vehicle, such as, for example, a video display screen of the type disclosed in U.S. Pat. No. 6,428,172 for REARVIEW MIRROR ASSEMBLY WITH UTILITY FUNCTIONS, and U.S. Pat. No. 6,175,300 for BLIND SPOT VIEWING SYSTEM, which are hereby incorporated herein by reference in their entireties. It has also been suggested to provide a mirror or a display which may be indexed in and out of a mirror case, such as from the bottom of the mirror case, such as also disclosed in U.S. Pat. No. 6,428,172, which is hereby incorporated herein by reference in its entirety.

SUMMARY OF THE INVENTION

(3) The present invention provides an interior rearview mirror assembly having a video display screen which may display video images captured by a camera or image sensor of the vehicle.

(4) According to an aspect of the present invention, an interior rearview mirror assembly for a vehicle comprises a casing, a variable reflectivity reflective element, such as positioned at a bezel portion of the casing, and a video display screen disposed in the casing and behind the reflective element. The video display screen is operable to display images that are viewable through the reflective element by a person viewing the rearview mirror assembly when it is normally mounted in a vehicle. The video display screen may function to brighten or enhance the intensity of the displayed images in response to a dimming condition of the variable reflectivity reflective element.

(5) According to another aspect of the present invention, an interior rearview mirror assembly for a vehicle comprises a casing, a reflective element, such as a prismatic reflective element, such as positioned at a bezel portion of the casing, and a video display screen disposed in the casing and behind the reflective element. The video display screen is operable to display images that are viewable through the reflective element by a person viewing the rearview mirror assembly when it

is normally mounted in a vehicle. The mirror assembly includes a decoder that decodes the NTSC signal from a camera or image sensor of the vehicle. The decoder has a microprocessor that is operable to control the video display screen, such that the images are processed and displayed with a common microprocessor, thereby obviating the need for a separate microprocessor for the video display screen.

(6) According to an aspect of the present invention, a mirror and compass system includes an interior rearview mirror assembly having a reflective element and a casing that are adjustable relative to a mounting structure. The mounting structure includes a mounting base. A compass chip having at least two magnetoresponsive sensing elements and compass circuitry established thereon is positioned at the mounting base. The compass chip has at least one connecting element for connecting to a vehicle wire harness that extends downward from the vehicle headliner (such as along the vehicle windshield and within a wire channel or wire guide element or the like) and that provides power to the compass chip.

(7) These and other objects, advantages, purposes and features of the present invention will become apparent upon review of the following specification in conjunction with the drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIG. **1** is a front elevation of an electro-optic interior rearview mirror assembly in accordance with the present invention, with the video display screen activated so that images are viewable through the reflective element;

(2) FIGS. **2-4** are perspective views of an interior rearview mirror assembly in accordance with the present invention, with the compass chip disposed at an upper end of a wire management portion of the mirror assembly;

(3) FIGS. **5-8** are perspective views of the compass chip incorporated into the interior rearview mirror assembly of FIGS. **2-4**;

(4) FIG. **9** is a perspective view of another interior rearview mirror assembly and compass chip in accordance with the present invention, with a compass chip disposed at a wire management element attachable to a mounting base of the mirror assembly;

(5) FIGS. **10** and **11** are exploded perspective views of the interior rearview mirror assembly and compass chip of FIG. **9**;

(6) FIGS. **12** and **13** are perspective views of the mirror mounting base and the wire management element that incorporates a compass chip in accordance with the present invention;

(7) FIGS. **14-31** are views of a display module displaying various images and/or icons and/or text information responsive to a control in accordance with the present invention;

(8) FIG. **32** is a sectional view of an electrochromic mirror assembly;

(9) FIG. **33** is a sectional view of another electrochromic mirror assembly, shown with a transparent display element in accordance with the present invention;

(10) FIG. **34** is a sectional view of another electrochromic mirror assembly, shown with a transparent display element in accordance with the present invention;

(11) FIG. **35** is schematic of a transparent OLED display suitable for use with the reflective element assembly of the present invention;

(12) FIG. **36** is another schematic of a transparent OLED display suitable for use with the reflective element assembly of the present invention; and

(13) FIGS. **37**A and **37**B are examples of a transparent OLED display suitable for use with the reflective element assembly of the present invention, shown in an activated and deactivated state.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

(14) Referring now to the drawings and the illustrative embodiments depicted therein, an interior

rearview mirror assembly **10** for a vehicle includes a casing, a bezel portion **12** and a reflective element **14** positioned at and at least partially within the casing and/or bezel portion (FIG. **1**). Mirror assembly **10** includes a video display screen device **16**, which is disposed within the mirror casing and behind the reflective element **14**. The video display screen device is operable to display information or images for viewing by the driver or other occupant or occupants of the vehicle when the video display screen device is activated, and is substantially not viewable or discernible when not activated, as discussed below.

(15) Video display screen device or module **16** may comprise any type of video screen and is operable to display images in response to an input or signal from a control or imaging system. For example, the video display screen may comprise a multi-pixel liquid crystal module (LCM) or liquid crystal display (LCD), preferably a thin film transistor (TFT) multi-pixel liquid crystal display (such as discussed below), or the screen may comprise a multi-pixel organic electroluminescent display or a multi-pixel light emitting diode (LED), such as an organic light emitting diode (OLED) or inorganic light emitting diode display or the like, or a passive reflective and/or backlit pixelated display, or an electroluminescent (EL) display, or a vacuum fluorescent (VF) display or the like. For example, the video display screen may comprise a video screen of the types disclosed in U.S. Pat. Nos. 7,370,983; 7,338,177; 7,274,501; 7,255,451; 7,195,381; 7,184,190; 6,902,284; 6,690,268; 6,428,172; 6,420,975; 5,668,663 and/or 5,724,187, and/or U.S. patent application Ser. No. 10/538,724, filed Jun. 13, 2005 and published Mar. 9, 2006 as U.S. Publication No. 2006/0050018; Ser. No. 11/226,628, filed Sep. 14, 2005 and published Mar. 23, 2006 as U.S. Publication No. 2006/0061008; Ser. No. 12/091,525, filed Apr. 25, 2008, now U.S. Pat. No. 7,855,755; Ser. No. 09/585,379, filed Jun. 1, 2000; Ser. No. 10/207,291, filed Jul. 29, 2002, and/or U.S. provisional applications, Ser. No. 61/238,862, filed Sep. 1, 2009; Ser. No. 61/180,257, filed May 21, 2009; Ser. No. 61/174,596, filed May 1, 2009; and/or Ser. No. 61/156,184, filed Feb. 27, 2009, which are hereby incorporated herein by reference in their entireties.

(16) Video display screen device **16** may be in communication with or may receive an input or video signal (such as a NTSC video signal or the like) from a corresponding imaging sensor or camera or imaging system and may display the image or images provided by the input or signal on the video display screen. Alternately, a video signal may be conveyed to the mirror assembly or system as a digital signal. The video display screen device or an imaging or vision system of the vehicle may include a control, which may be in communication with the video display screen via a wireless communication link or via an electrical connector or wiring or cable or the like.

(17) The control is operable to control the video display screen in response to an input or signal, such as a signal received from one or more cameras or image sensors of the vehicle, such as a video camera or sensor, such as a CMOS imaging array sensor, a CCD sensor or the like, such as the types disclosed in U.S. Pat. Nos. 5,550,677; 5,760,962; 6,396,397; 6,097,023; 5,877,897 and 5,796,094, and/or U.S. patent application Ser. No. 10/534,632, filed May 11, 2005, and/or U.S. provisional application Ser. No. 61/785,565, filed May 15, 2009, which are hereby incorporated herein by reference in their entireties, or from one or more imaging systems of the vehicle, such as a reverse or backup aid system, such as a rearwardly directed vehicle vision system utilizing principles disclosed in U.S. Pat. Nos. 5,550,677; 5,760,962; 5,670,935; 6,201,642; 6,396,397; 6,498,620; 6,717,610 and/or 6,757,109, which are hereby incorporated herein by reference in their entireties, a trailer hitching aid or tow check system, such as the type disclosed in U.S. Pat. No. 7,005,974, which is hereby incorporated herein by reference in its entirety, a cabin viewing or monitoring device or system, such as a baby viewing or rear seat viewing camera or device or system or the like, such as disclosed in U.S. Pat. Nos. 5,877,897 and/or 6,690,268, which are hereby incorporated herein by reference in their entireties, a video communication device or system, such as disclosed in U.S. Pat. No. 6,690,268, which is hereby incorporated herein by reference in its entirety, and/or the like. The imaging sensor or camera may be activated and the

display screen may be activated in response to the vehicle shifting into reverse, such that the display screen is viewable by the driver and is displaying an image of the rearward scene while the driver is reversing the vehicle.

(18) Optionally, the video display screen may be operable responsive to other cameras and/or navigation systems and/or the like, and may be operable at any time during operation of the vehicle. Thus, the video display screen may be operable during daytime and nighttime driving conditions and may be operable when the variable reflectivity reflective element is dimmed or darkened. Thus, the intensity of the display may be adjusted to account for a reduced transmissivity of the reflective element.

(19) Optionally, and desirably, the intensity or brightness or contrast of the video display screen may be automatically adjusted in response to an ambient light sensor or glare detector, such as a sensor of the display screen device, or of the interior rearview mirror assembly or vehicle or of a console or module or the like, such as the types disclosed in U.S. Pat. Nos. 4,793,690 and/or 5,193,029, which are hereby incorporated herein by reference in their entireties. In applications where the display screen device is implemented with an electro-optic or electrochromic mirror reflective element assembly (such as shown in FIG. **1**), the display screen device may be automatically adjusted in response to the ambient light sensor or glare detector associated with the electro-optic or electrochromic circuitry or system. The display intensity of the display screen may be adjusted in response to the photo sensor or light sensor, and may be increased during daytime lighting conditions and reduced at dusk or during nighttime lighting conditions. The intensity and/or contrast and/or brightness of the display may be substantially continuously adjusted or may be adjusted intermittently or in steps in response to the light sensor or sensors, such as by utilizing aspects of the displays described in U.S. Pat. Nos. 7,370,983; 5,416,313 and 5,285,060, and/or U.S. patent application Ser. No. 12/091,525, filed Apr. 25, 2008, now U.S. Pat. No. 7,855,755, which are hereby incorporated herein by reference in their entireties.

(20) Optionally, the video display screen may be operable to adjust the intensity of the displayed images in response to a degree of dimming of the electro-optic (such as electrochromic) reflective element of the mirror assembly. The video display screen thus may be adjusted responsive to an output signal of the glare light sensor or an output of the mirror reflective element dimming circuitry or the like. For example, as the reflective element is dimmed or darkened (such as in response to a detection of glare light at the mirror assembly) to reduce glare to the driver of the vehicle, the video display screen may be automatically brightened. Desirably, the video display screen is brightened relative to the degree of dimming so that the displayed images remain at a substantially constant intensity as viewed by the driver of the vehicle, so that the increasing/decreasing intensity of the video display is not readily discernible to the driver of the vehicle. Such an automatic intensity adjustment function is particularly suitable for a video display screen that may be operable in response to various camera inputs and/or navigation system inputs and/or the like, and not only responsive to a rear vision camera (where the dimming controls are typically deactivated when the vehicle is shifted into a reverse gear).

(21) In such an application, the mirror dimming control may still be inhibited when the vehicle is shifted into a reverse gear, but will be active during other driving conditions, and the video display screen will also be active during reverse and forward driving conditions. Thus, when the video decoder (that may be part of the video display device or module) determines that there is a valid video signal, the video decoder may communicate to the mirror microprocessor to activate the back light of the display module, and the mirror circuitry and/or display circuitry may adjust the intensity of the video display screen in response to a detected ambient lighting condition and a detected glare lighting condition (and/or in response to a degree of dimming of the reflective element as set by the mirror circuitry). As the mirror reflective element is dimmed or darkened, the video display screen may re-brighten the video display intensity based on the EC coloring or dimming percentage in front of the video display screen. Likewise, as the mirror reflective element

is bleached or undimmed, the video display screen may reduce its intensity accordingly.
(22) Desirably, the display screen emits light that is bright enough to be readily viewable and discernible during high ambient lighting conditions, such as are typically encountered on a sunny day. Preferably, the display luminance (and especially for a TFT LCD display element showing video or full color video or still images) is greater than about 300 candelas per square meter (cd/m.sup.2), more preferably greater than about 500 cd/m.sup.2, and more preferably greater than about 700 cd/m.sup.2. This is to help ensure that the driver can discern any video image being displayed against the sunlight streaming in through the rear window and incident at the display screen at the interior mirror assembly that will tend to wash-out the video image unless the video image is sufficiently bright. Optionally, the display screen may utilize aspects of the display element described in U.S. patent application Ser. No. 12/091,525, filed Apr. 25, 2008, now U.S. Pat. No. 7,855,755, which is hereby incorporated herein by reference in its entirety.
(23) Conventionally, a video system may include a decoder for receiving and decoding video signals from the cameras or image sensors, and the video system further includes a connection or communication of the signals to a microprocessor of the video display device. The likes of conventional prismatic video mirrors typically utilize a two board approach with two separate processors: one processor on the video display screen device or module (typically, the video display device is provided as a liquid crystal video screen device or module or LCM with integrated backlighting and various brightness enhancing means) and another processor on the printed circuit board or circuit element or mirror board or mirror PCB. The processor on the mirror PCB may be operable to control various functions, such as the video display dimming, the power supply to the video display device module, the human-machine interface (HMI) switch for turning the video display on/off, and to provide protection and regulated power supply to the video display module and back light.
(24) Optionally, the present invention may provide a decoder that includes a microprocessor built into the package and with “OSD” (On Screen Display) capability. Thus, the control circuitry on the mirror circuit element or PCB may be moved into the decoder and thus combine the display module circuit element or PCB decoder electronics with the mirror circuit element or PCB electronics. Such combined circuitry can eliminate the need for an additional processor on the mirror PCB and will combine all feature control into the decoder. This saves system cost, improves EMC, reduces the PCB size and gives enhanced or full control of the video mirror system to one processor.
(25) Optionally, such a combined circuitry decoder may include additional enhancement to the existing decoder chip so that the decoder may also control the dimming of a variable reflectivity reflective element or electro-optic or electrochromic reflective element. This would eliminate the mirror EC PCB assembly and would combine all the mirror electronics on a single or common circuit element or PCB that would have the decoder control all the video and reflective element dimming features.
(26) For example, a decoder, such as a Techwell 8817 decoder available from Techwell Inc. of San Jose, CA, or other suitable decoder, may be disposed at a video display screen and may receive standard video signals, such as NTSC signals or PAL signals or the like, from one or more cameras of the vehicle. The decoder may decode the NTSC signals and may digitize the signals and send the digital signal to the display screen or LCD TFT screen. The decoder provides on screen display (OSD) capabilities and may provide other signals or messages with the video feed to the video screen.
(27) Optionally, such a decoder (such as a Techwell 8817 Decoder or the like) may be implemented with a video screen for a prismatic video mirror application. For example, the decoder may have a microprocessor and/or other data processing resources, such as memory, converters (such as A/D converters and/or the like), and/or CAN/LIN controllers and/or the like, incorporated into the same integrated circuit chip or package and may include OSD capability too. Thus, as well as

functioning as a decoder, the same chip or package can provide intelligence/data processing/control for another function/functions or accessory/accessories in the mirror assembly, such as automatic dimming control of an antiglare electrochromic rearview mirror and/or intensity control of display backlighting, such as responsive to a photosensor of the interior rearview mirror assembly. Current prismatic video mirrors may utilize a two board approach with two separate processors (one processor may be on the mirror PCB in order to control the video display dimming, power supply to the LCM or display screen, the HMI Switch for turning the video display ON/OFF and/or supply protection and regulated power supply to the LCM or video display screen and back light.

(28) For example, such a decoder, such as the Techwell 8817 Decoder, may include a board or substrate with circuitry established thereon, including a video decoder (that receives the standard video signal or NTSC signal), a microcontroller, OSD circuitry, image enhancement circuitry (which may include a built-in **2**D de-interlacing engine and a high quality scalar, and may provide programmable hue, brightness, saturation, contrast, sharpness control with vertical peaking, programmable color transient improvement control, panorama/water-glass scaling, programmable Gamma correction tables, black/white stretch, programmable favorite color enhancement, and an LED controller (for controlling the backlighting LEDs of the TFT backlit video display. The decoder may also include other circuitry as desired or appropriate depending on the particular application of the decoder and video display module. The decoder may support a two-wire serial bus interface for interfacing with a bus system or network of the vehicle.

(29) The present invention thus moves control circuitry, such as, for example, a microprocessor and allied circuitry associated with EC dimming of the mirror element, that is currently on the mirror printed circuit board or PCB into the decoder and combines the video display module or LCM PCB decoder electronics with at least a portion of the mirror PCB electronics into a single unitary integrated circuit or chip or package. Such combination and incorporation of the electronics onto a single decoder board limits or substantially precludes the need for an additional processor on the mirror PCB and combines all feature control into the decoder. The present invention thus reduces system cost, improves EMC, reduces PCB size and may provide full control of the video mirror system to one processor.

(30) Optionally, the decoder of the present invention may be used in an electrochromic (EC) video mirror assembly. For example, the above described decoder may be carried over and with additional enhancement to the existing decoder chip could be a viable solution to also control the EC feature utilizing the decoder too. Such a configuration may limit or substantially preclude or eliminate the mirror EC PCB assembly and may combine all electronics on a single circuit element or board or PCB, whereby the decoder may control all the video and EC features.

(31) Thus, the decoder of the present invention may be readily attached to or connected to a video display module or screen, such as at the rear of the display module. The decoder may be electrically connected to the wire or wires from the camera/cameras and to any other wires of the mirror assembly, whereby the decoder is ready for operation. The decoder thus provides video decoding functions and on screen display functions in a single decoder board. The NTSC (or other standard video input or signal) thus is received by the decoder and is decoded by the decoder, whereby the OSD of the decoder may generate the display signal to the video screen and may send the video display images by themselves or may mix the video signal/images with other display information, such as graphic overlays or textual information or iconistic display information or the like.

(32) For example, and with reference to FIGS. **14** and **15**, the decoder may control the video display screen to display video images of a scene captured by one or more cameras of the vehicle, and may generate a graphic overlay that is electronically generated and superimposed on the video image by the decoder. Optionally, the decoder may function to display on the video display other messages or signals for viewing by the driver of the vehicle. For example, and with reference to FIGS. **16**-**31**, the decoder may function to display camera status information, EC dimming status

information, toll information and toll payment card status information, blind spot detection or object detection information, directional heading information, fuel gauge status information, telephone call status information or other telematics system information, vehicle fluid level status information, seat belt status information, tire pressure information, directional heading and/or temperature information, and/or the like.

(33) Typically, a backlit video screen utilized in an interior rearview mirror is provided as a package or module that typically has a 2.4 inch to 4.3 inch diagonal dimension (typically around 3.5 inches) and an aspect ratio of width to height of about 4:3 or about 15:9 or 16:9, and typically has an active area of around 72 mm wide and 53 mm high for a typical 3.5 inch diagonal screen with a 4:3 aspect ratio, with around 70,000-80,000 or thereabouts TFT RGB pixel resolution, or a typical 16:9 aspect ratio screen may have an active area of around 71 mm wide and 43 mm high, with around 96,000 or thereabouts TFT RGB pixel resolution. The video screen module or package has a circuit board and its control circuitry disposed at a rear of the package or module, such as by utilizing aspects of U.S. Pat. Nos. 7,004,593 and 7,370,983, which are hereby incorporated herein by reference in their entireties. Preferably, the circuitry required for operation of the display itself (including the video decoding and control of the backlighting and/or the like) and of the associated rearview mirror (such as electrochromic dimming and/or the like) is established on a printed circuit board or equivalent that attaches at the rear of the video display screen module or package and is roughly dimensioned to be the same as or close to the size and shape of the video display screen module or package.

(34) Thus, the decoder of the present invention may decode the video signal and may provide OSD capability and EC control capability, and may receive inputs from sensors (such as imaging sensors or photosensors or the like), and may receive switch inputs and may control various accessories in response to the user inputs or switch inputs. The decoder may share or access photo sensors to control the dimming of the display. The decoder thus provides a highly integrated TFT flat panel display controller at a reduced cost, and integrates a microprocessor in the single circuit element or board or chip. The decoder may provide UART capability, I.sup.2C capability, SPI capability and/or the like. Optionally, the decoder may include a transceiver or the like and the decoder may connect to or link to a LIN node of a network system of the vehicle.

(35) Optionally, the mirror assembly may include or may be associated with a compass sensor and circuitry for a compass system that detects and displays the vehicle directional heading to a driver of the vehicle. Optionally, an integrated automotive “compass-on-a-chip” may be disposed in a cavity of the mounting base of the mirror (or within the mirror housing or in an attachment to the mirror mount or elsewhere within the mirror assembly such as to the rear of the video screen or to the rear of the mirror reflective element) and may comprise at least two magneto-responsive sensor elements (such as a Hall sensor or multiple Hall sensors), associated A/D and D/A converters, associated microprocessor(s) and memory, associated signal processing and filtering, associated display driver and associated LIN/CAN BUS interface and the like, all (or a sub-set thereof) created or disposed or commonly established onto a semiconductor chip surface/substrate or silicon substrate, such as utilizing CMOS technology and/or fabrication techniques as known in the semiconductor manufacturing arts, and constituting an ASIC chip, such as utilizing principles described in U.S. Pat. Nos. 7,329,013 and/or 7,370,983, and/or U.S. patent application Ser. No. 11/226,628, filed Sep. 14, 2005 and published Mar. 23, 2006 as U.S. Publication No. 2006/0061008, which are hereby incorporated herein by reference in their entireties, which are hereby incorporated herein by reference in their entireties, and/or such as by utilizing aspects of an EC driver-on-a-chip such as described in U.S. patent application Ser. No. 11/201,661, filed Aug. 11, 2005, now U.S. Pat. No. 7,480,149, which is hereby incorporated herein by reference in its entirety. The ASIC chip may be small (preferably less than approximately a two square centimeter area, more preferably less than approximately a 1.5 square centimeter area, and most preferably less than approximately a one square centimeter area or thereabouts) and readily packagable into

the mirror assembly (or a feed from such a compass-on-a-chip may be provided to the mirror assembly from a compass-on-a-chip packaged elsewhere in the vehicle cabin remote from the mirror assembly such as in an instrument panel portion or in roof console portion). Such large scale integration onto the likes of the silicon substrate/chip can allow a compass functionality to be provided by a relatively small chip, and with appropriate pin out or electrical leads provided as is common in the electrical art.

(36) As shown in FIGS. **2**-**4**, a compass chip or compass module **30** may be disposed at an upper end of the mounting base **32** of a mirror assembly **34**, such as at an upper or connecting end of a wire management element **33** connected to or extending from the mounting base **32** of the mirror assembly. The compass chip **30** may have a connector or connecting elements **36** established on the chip substrate. As shown in FIGS. **3**-**8**, compass chip or module **30** includes a housing **30***a* having the connector **36** at one end and a housing portion **37** at the other end, with the compass chip circuitry **40** housed within the housing portion **37** and electrically connected to the connector terminals. In the illustrated embodiment, the connector **36** is at the upper end or region of the wire management element at the mounting base and at a portion of the wire management element or mounting base extension that mounts to or has attached to it a wire management element or channel or cover element **38** (FIGS. **3** and **4**), such as a wire management system or element of the types described in U.S. patent application Ser. No. 11/226,628, filed Sep. 14, 2005 and published Mar. 23, 2006 as U.S. Publication No. 2006/0061008; and/or Ser. No. 11/584,697, filed Oct. 20, 2006, now U.S. Pat. No. 7,510,287, which are hereby incorporated herein by reference in their entireties.

(37) A wire harness **42** of the vehicle may be routed along channel or cover element **38** and may plug into or readily connect to connector **36** of compass chip **30** to provide the electrical power and/or control to the compass system and to any other circuitry or device or system associated with or established on or connected to the compass chip. Thus, the compass chip is provided at the mounting base of the mirror assembly or at a wire management element at the mounting base of the mirror assembly, and may be readily connected to the vehicle wire harness to enhance the assembly processes at the vehicle assembly plant. The compass chip thus may provide all of the compass electronics and circuitry at the compass chip, whereby no electronics need be provided within the mirror assembly.

(38) The integrated compass chip may be connected to a power in or supply lead or wiring harness (such as a wiring harness that extends down from the headliner of the vehicle) and may connect to a wiring or harness of the mirror assembly. Preferably, the compass chip may connect between and in-line with the vehicle wiring harness and the mirror wiring harness (which may connect between the mounting base of the mirror assembly and the mirror casing, such as in the manner described in U.S. Pat. Nos. 7,329,013 and/or 7,370,983, and/or U.S. patent application Ser. No. 11/226,628, filed Sep. 14, 2005 and published Mar. 23, 2006 as U.S. Publication No. 2006/0061008; and/or Ser. No. 11/584,697, filed Oct. 20, 2006, now U.S. Pat. No. 7,510,287, which are hereby incorporated herein by reference in their entireties), or in-line with another plug/socket connector of the vehicle. The integrated compass chip thus may be readily connected, such as via plug-in-socket type connections, to both wires or harnesses to electrically connect the compass chip to the power source and to a display or user interface or input at the mirror. The connectors of the compass chip may be selected such that when the compass chip is not selected as an option of the vehicle, the vehicle wiring harness connects to or plugs into the mirror harness or wiring in the same manner, such that common wiring harnesses and/or connectors may be used at the vehicle and mirror, regardless of whether or not the compass system is included. Thus, an electronic chip (such as an integrated compass-on-a-chip) may be connected in-line with an existing plug/socket arrangement in the vehicle such that the presence of the chip-in-line is largely unnoticed by the vehicle occupants.

(39) Optionally, such a connection can be made to the compass chip via a plug-and-socket type connection between the vehicle wire harness and a connector established at the compass chip.

Optionally, the compass chip (such as at the connector end of the compass chip) may include terminals extending therefrom or receiving portions established therein and configured to electrically connect to the vehicle wire harness at the upper region of the mounting base.

(40) Optionally, the compass chip may be disposed at the mirror mounting base, whereby when the wire harness connects to the compass chip, the compass chip may be sealed or encased within the mirror mounting base. Optionally, the compass chip may be disposed inside a connector element and may be substantially sealed or encased therein to protect the circuitry on the compass chip.

(41) For example, and with reference to FIGS. **9-13**, a compass chip or compass module **130** may be disposed at an upper end or portion of a mounting base of a mirror assembly **134**, such as at an upper mounting base portion **132***a* that is connected to or mounted at or extends from a lower mounting base portion **132***b* of the mirror assembly **134**. The compass chip **130** may be disposed within the upper mounting base portion **132***a*, which may have a wire **136** and/or a connector or connecting elements established at its upper end for connecting to a vehicle wire harness or the like. The compass chip or circuitry may be disposed within upper mounting portion **132***a*, such as at or near the lower region of the upper mounting portion so as to be disposed at or near the fixedly mounted or attached lower mounting base **132***b* (which may be fixedly secured to a mounting button or element **140** affixed or adhered to the vehicle windshield). The compass chip of the upper mounting base portion may be similar in construction to the compass chip **30**, described above, such that a detailed discussion of the compass chips need not be repeated herein.

(42) In the illustrated embodiment, the connector or wire **136** extends from the upper end or region of the upper mounting base portion **132***a* and may be routed along or within a wire management element or channel or cover element **138** that routes and conceals the wire between the upper mounting base portion **132***a* and the vehicle headliner at the upper region of the vehicle windshield. A wire harness of the vehicle may be routed along channel or cover element **138** and may plug into or readily connect to connector or wire **136** of compass chip **130** to provide the electrical power and/or control to the compass system and to any other circuitry or device or system associated with or established on or connected to the compass chip. Optionally, the upper end or portion of the upper mounting base portion may have a connector established thereat, whereby a vehicle wire harness may extend down from the headliner (and along and within a wire management element) for connection to the connector and compass chip at the upper mounting base portion.

(43) As can be seen in FIGS. **10** and **11**, the upper mounting base portion **132***a* and the lower mounting base portion **132***b* may be configured so that the upper mounting base portion **132***a* is readily connectable to the lower mounting base portion **132***b*, such as via a plug and socket connecting configuration or the like. Thus, the upper mounting base portion **132***a* may be readily mounted to or attached to or plugged into the lower mounting base portion **132***b* to position the compass chip at or near the mounting base of the mirror assembly. Optionally, the mounting base portions **132***a*, **132***b* may include electrical connectors so as facilitate electrical connection of the compass chip and/or vehicle wire harness to electrical circuitry at the lower mounting base portion or at the mirror assembly (such as via a wire or cable or other electrical connection between the lower mounting base portion and the mirror casing or circuitry therein) when the upper mounting base portion is connected to or mounted at the lower mounting base portion.

(44) Thus, the compass chip or compass module is provided at the mounting base of the mirror assembly and may be readily connected to the vehicle wire harness to enhance the assembly processes at the vehicle assembly plant. The compass chip thus may provide all of the compass electronics and circuitry at the compass chip, whereby no electronics need be provided within the mirror assembly (such that the compass chip may be suitable for application to base mirrors, such as base prismatic mirrors and the like).

(45) Thus, the compass chip may be small enough to fit at or in the wire management structure or mounting base structure at the mirror mounting base and may readily connect to the vehicle wire harness to receive power and/or control from the vehicle wire harness. Optionally, the compass

chip may include all circuitry and microprocessor needed to operate the compass system and any other associated accessories or systems, and the mirror assembly may not include any circuitry in its mirror casing. Optionally, and desirably, the compass chip or module or housing and/or the wire management element or the upper mounting portion is/are configured to support the compass sensors at an appropriate angle such that the sensors are generally horizontal when the compass chip is mounted along the windshield of the vehicle.

(46) Optionally, such a compass-on-a-chip ASIC may also include the hardware and software required to receive an output from a temperature sensor (such as a thermocouple or thermostat that is located external the vehicle cabin in order to sense and monitor the temperature external to the vehicle) and to convert this signal to a reading in degrees Fahrenheit or Celsius, and to provide this reading via an on-chip temperature display driver and/or via a BUS protocol or via an on-chip wireless transmitter or the like to a digital or other type of temperature display so that the driver and/or occupants of the vehicle can view the temperature being measured (such as the temperature external the vehicle and/or the temperature within the vehicle cabin). Thus, for example, a monolithic compass/temp-on-a-chip ASIC may be disposed in the likes of a mirror mount or within the mirror head/housing of an interior rearview mirror assembly, and it may provide both the external temperature readout and a compass direction heading readout to an information display at the mirror head/housing (or elsewhere in the vehicle, such as the instrument panel/cluster or at an overhead console or accessory module or the like). Optionally, such a chip or circuit board or circuitry may also or otherwise comprise EC driver circuitry for controlling/driving an electro-optic or electrochromic reflective element or cell, such as by utilizing aspects of the EC driver-on-a-chip such as described in U.S. patent application Ser. No. 11/201,661, filed Aug. 11, 2005, now U.S. Pat. No. 7,480,149, which is hereby incorporated herein by reference in its entirety.

(47) The printed circuit board or equivalent may comprise a generally flat, rectangular element or substrate with conductive traces and circuitry disposed thereon. Because it is desired to provide sensing in the x-y directions (or in a horizontal plane), the compass sensor is preferably disposed so that the compass sensor elements are generally horizontal when the mirror assembly is installed in the vehicle.

(48) The compass chip may be in communication with a compass display, which may provide a display region at the reflective element, and which includes ports or portions, which may comprise icons, characters or letters or the like representative of only the cardinal directional points, such as, for example, the characters N, S, E, W, formed or etched in the reflective film coating of the reflective element (and forming a transparent window therein), such as via techniques such as disclosed in commonly assigned U.S. Pat. Nos. 4,882,565 and/or 7,004,593, which are hereby incorporated by reference herein in their entireties. Optionally, however, reflective element may comprise a transflective or display on demand (DOD) reflective element, and the compass display may be a display on demand (DOD) type of display, such as disclosed in commonly assigned U.S. Pat. Nos. 7,195,381; 6,690,268; 5,668,663 and 5,724, 187, which are hereby incorporated by reference herein in their entireties, without affecting the scope of the present invention.

(49) Optionally, the sensor may comprise a two-axis sensor (comprising two magneto-responsive sensor elements disposed at a fixed angle relative to each other, such as, preferably, orthogonally to each other, and disposed in the cavity generally parallel to the floor plane of the vehicle so as to be sensitive to the horizontal component of the Earth's magnetic field), or the sensor may comprise a three-axis sensor (comprising two magneto-responsive sensor elements disposed orthogonally to each other and disposed in the cavity, and a third magneto-responsive sensor element at a right angle (approximately ninety degrees) to the two sensor elements and disposed in the cavity, so that the three-axis sensor is sensitive to the horizontal component and to the vertical component of the Earth's magnetic field), without affecting the scope of the present invention. The sensor may be arranged at a desired angle to provide enhanced sensing in the horizontal directions when the mirror assembly is installed in the vehicle. For example, aspects of constructions such as are

disclosed in U.S. Pat. Nos. 6,140,933 and 6,928,366, which are hereby incorporated herein by reference in their entireties, may be utilized.

(50) Optionally, the compass system and compass circuitry may utilize aspects of the compass systems described in U.S. Pat. Nos. 7,370,983; 7,249,860; 7,004,593; 6,642,851; 4,546,551; 5,699,044; 4,953,305; 5,576,687; 5,632,092; 5,677,851; 5,708,410; 5,737,226; 5,802,727; 5,878,370; 6,087,953; 6,173,508; 6,222,460 and/or 6,513,252, and/or PCT Application No. PCT/US2004/015424, filed May 18, 2004 and published on Dec. 2, 2004 as International Publication No. WO 2004/103772, and/or European patent application published Oct. 11, 2000 under Publication No. EP 0 1043566, and/or U.S. provisional applications, Ser. No. 60/624,091, filed Nov. 1, 2004; Ser. No. 60/636,931, filed Dec. 17, 2004; Ser. No. 60/638,250, filed Dec. 21, 2004; Ser. No. 60/642,227, filed Jan. 7, 2005; and Ser. No. 60/653,787, filed Feb. 17, 2005, which are all hereby incorporated herein by reference in their entireties. The compass circuitry may include compass sensors, such as a magneto-responsive sensor, such as a magneto-resistive sensor, a magneto-capacitive sensor, a Hall sensor, a magneto-inductive sensor, a flux-gate sensor or the like. The sensor or sensors may be positioned at and within a base portion of the mirror assembly so that the sensor/sensors is/are substantially fixedly positioned within the vehicle, or may be attached or positioned within the mirror casing. Note that the magneto-responsive sensor used with the mirror assembly may comprise a magneto-responsive sensor, such as a magneto-resistive sensor, such as the types disclosed in U.S. Pat. Nos. 5,255,442; 5,632,092; 5,802,727; 6,173,501; 6,427,349 and 6,513,252 (which are hereby incorporated herein by reference in their entireties), or a magneto-inductive sensor, such as described in U.S. Pat. No. 5,878,370 (which is hereby incorporated herein by reference in its entirety), or a magneto-impedance sensor, such as the types described in PCT Publication No. WO 2004/076971, published Sep. 10, 2004 (which is hereby incorporated herein by reference in its entirety), or a Hall-effect sensor, such as the types described in U.S. Pat. Nos. 6,278,271; 5,942,895 and 6,184,679 (which are hereby incorporated herein by reference in their entireties). The sensor circuitry and/or the circuitry in the mirror housing and associated with the sensor may include processing circuitry. For example, a printed circuit board may include processing circuitry which may include compensation methods, such as those described in U.S. Pat. Nos. 4,546,551; 5,699,044; 4,953,305; 5,576,687; 5,632,092; 5,677,851; 5,708,410; 5,737,226; 5,802,727; 5,878,370; 6,087,953; 6,173,508; 6,222,460 and 6,642,851, which are all hereby incorporated herein by reference in their entireties. The compass sensor may be incorporated in or associated with a compass system and/or display system for displaying a directional heading of the vehicle to the driver, such as a compass system of the types described in U.S. Pat. Nos. 5,924,212; 4,862,594; 4,937,945; 5,131,154; 5,255,442; 5,632,092 and/or 7,004,593, and/or PCT Application No. PCT/US2004/015424, filed May 18, 2004 and published on Dec. 2, 2004, as International Publication No. WO 2004/103772, which are all hereby incorporated herein by reference in their entireties.

(51) Optionally, and as shown in FIG. **1**, the mirror assembly may comprise an electro-optic or electrochromic mirror assembly and may include an electro-optic or electrochromic reflective element. The electrochromic mirror element of the electrochromic mirror assembly may utilize the principles disclosed in commonly assigned U.S. Pat. Nos. 6,690,268; 5,140,455; 5,151,816; 6,178,034; 6,154,306; 6,002,544; 5,567,360; 5,525,264; 5,610,756; 5,406,414; 5,253,109; 5,076,673; 5,073,012; 5,117,346; 5,724,187; 5,668,663; 5,910,854; 5,142,407 and/or 4,712,879, and/or U.S. provisional applications, Ser. No. 61/232,246, filed Aug. 7, 2009; Ser. No. 61/186,204, filed Jun. 11, 2009; and Ser. No. 61/164,593, filed Mar. 30, 2009, which are hereby incorporated herein by reference in their entireties, and/or as disclosed in the following publications: N. R. Lynam, “Electrochromic Automotive Day/Night Mirrors”, SAE Technical Paper Series 870636 (1987); N. R. Lynam, “Smart Windows for Automobiles”, SAE Technical Paper Series 900419 (1990); N. R. Lynam and A. Agrawal, “Automotive Applications of Chromogenic Materials”, Large Area Chromogenics: Materials and Devices for Transmittance Control, C. M. Lampert and

C. G. Granquist, EDS., Optical Engineering Press, Wash. (1990), which are hereby incorporated by reference herein in their entireties; and/or as described in U.S. Pat. No. 7,195,381, which is hereby incorporated herein by reference in its entirety. Optionally, the electrochromic circuitry and/or a glare sensor (such as a rearward facing glare sensor that receives light from rearward of the mirror assembly and vehicle through a port or opening along the casing and/or bezel portion and/or reflective element of the mirror assembly) and circuitry and/or an ambient light sensor and circuitry may be provided on one or more circuit boards of the mirror assembly. The mirror assembly may include one or more other displays, such as the types disclosed in U.S. Pat. Nos. 5,530,240 and/or 6,329,925, which are hereby incorporated herein by reference in their entireties, and/or display-on-demand transflective type displays, such as the types disclosed in U.S. Pat. Nos. 7,274,501; 7,255,451; 7,195,381; 7,184,190; 5,668,663; 5,724,187 and/or 6,690,268, and/or in U.S. patent application Ser. No. 11/226,628, filed Sep. 14, 2005; and/or Ser. No. 10/538,724, filed Jun. 13, 2005, and/or PCT Application No. PCT/US03/29776, filed Sep. 9, 2003 and published Apr. 1, 2004 as International Publication No. WO 2004/026633, which are all hereby incorporated herein by reference in their entireties. The thicknesses and materials of the coatings on the substrates, such as on the third surface of the reflective element assembly, may be selected to provide a desired color or tint to the mirror reflective element, such as a blue colored reflector, such as is known in the art and such as described in U.S. Pat. Nos. 5,910,854; 6,420,036 and/or 7,274,501, and in PCT Application No. PCT/US03/29776, filed Sep. 9, 2003 and published Apr. 1, 2004 as International Publication No. WO 2004/026633, which are all hereby incorporated herein by reference in their entireties.

(52) For example, and with reference to FIG. **32**, a mirror reflective element assembly **210** may comprise an electro-optic (such as electrochromic) mirror reflective element assembly with a first or front substrate **212** having a first or front surface **212***a* (the surface generally facing the driver of a vehicle when the mirror reflective element assembly is normally mounted in the vehicle) and a second or rear surface **212***b* and a second or rear substrate **214** having a third or front surface **214***a* and a fourth or rear surface **214***b*. A perimeter seal **216** is disposed between the front and rear substrates and spaces the substrates apart and defines an interpane cavity between the substrates with an electro-optic (such as electrochromic) medium **218** disposed within the interpane cavity and contacting a transparent conductive layer or coating **220** at the second surface **212***b* of front substrate **212** and a metallic reflector layer or coating **222** at the third surface **214***a* of rear substrate **214**. A light absorbing layer or coating or film **224** may be disposed at the rear or fourth surface **214***b* of rear substrate **214**. Optionally, the third surface or rear surface of the rear substrate may have a transparent conductive coating established thereat and a metallic reflector may be disposed at the fourth surface or rear surface of the rear substrate. In such an embodiment, the mirror reflective element assembly need not include the light absorbing layer at the rear surface of the rear substrate.

(53) Optionally, and with reference to FIG. **33**, a mirror reflective element assembly **210′** may include a transparent organic light emitting diode (OLED) display element or device **230′** disposed at a display region or portion of front substrate **212** and in front of the front substrate **212**. In the illustrated embodiment, transparent OLED display **230′** is disposed at first or front surface **212***a* of front substrate **212**, with a thin or ultra-thin glass cover sheet **232′** (such as a thin glass cover sheet having a thickness of less than about 1 mm and preferably less than about 0.5 mm or thereabouts and greater than 0.1 mm) disposed over the front substrate **212** and the OLED display **230′**. The cover sheet **232′** may be attached to the front substrate **212**, such as via a laminating material **234′** between the front surface **212***a* of front substrate **212** and a rear surface **232***b′* of cover sheet **232′**. The reflective element assembly **210′** includes transparent electrically conductive tracks or layers **236′** disposed at the front or first surface **212***a* of front substrate **212** to facilitate electrical connection to the OLED display **230′**. Optionally, the conductive tracks or layers **236′** (such as transparent tracks or raceways of indium tin oxide (ITO) or the like) may extend over and

encompass the perimeter edge of the front substrate so as to provide a wraparound electrically conductive track to ease electrical connection to the transparent OLED display. In this or in a similar manner, electrical power and/or signals may be delivered to the transparent OLED display via transparent conductors/transparent conductor paths established such as at the front surface of the front substrate and at or near the perimeter region of the reflective element assembly so as to be at least partially and preferably substantially non-discernible/non-visible to a driver viewing the reflective element assembly when the mirror assembly and reflective element assembly are normally mounted in the vehicle.

(54) Optionally, and with reference to FIG. **34**, a mirror reflective element assembly **210**″ may include a transparent organic light emitting diode (OLED) display element or device **230**″ that may comprise the front of the front substrate of the reflective element assembly. In the illustrated embodiment, OLED display **230**″ has a transparent electrically conductive layer or coating **220**″ disposed at its rear or second surface **230***b*″ and a transparent electrically conductive layer **221**″ disposed at its front or first surface **230***a*″. The transparent OLED display **230**″ thus encompasses substantially the entire reflective element assembly, and may have a thin or ultra-thin glass cover sheet **232**″ disposed over and laminated to OLED display **230**″ (such as at the transparent electrically conductive layer **221**″ at the front or first surface **230***a*″ of transparent OLED display **230**″) via a laminating material **234**″. Optionally, the transparent OLED display may comprise an outer or front substrate or panel of the reflective element assembly, and the reflective element assembly may not include the thin or ultrathin cover sheet over the display.

(55) The OLED display preferably comprises a substantially transparent display that is substantially transparent when not activated or energized. Optionally, for example, the OLED display may comprise a transparent OLED display element of the types commercially available from NeoView Kolon Co., Ltd. [see www.neoviewkolon.com]. For example, and as shown in FIGS. **35** and **36**, the transparent OLED display may include an organic film structure and electrodes established at the front surface or first surface of a substrate, such as a glass substrate of the reflective element assembly. An encapsulation layer may encapsulate the transparent metal cathodes and ITO anodes (or other transparent electrically conductive anodes), with an emission layer disposed between the metal cathode and ITO anode. As can be seen in FIG. **36**, an electron transport layer, an emission layer, a hole transport layer and a hole injection layer are sandwiched between a transparent electrically conductive ITO anode (that is disposed on a glass substrate) and a transflective metal cathode that has a very low to negligible reflection and a high transmission (such as at least at least about 50 percent transmissive of visible light therethrough, more preferably at least about 65 percent transmissive of visible light therethrough, and more preferably at least about 75 percent transmissive of visible light therethrough). Alternately, the low reflection/high transmittance metal cathode (which typically is a very thin metal thin film layer) may be replaced with a transparent conductive layer. Optionally, such as shown in FIG. **34**, the glass substrate of the transparent OLED display may be coated at its rear surface with a transparent conductive coating (such as ITO or the like) and the electro-optic medium may abut the rear surface of the substrate of the transparent OLED display.

(56) When an electric current is passed between the electrodes, light is emitted with a color that is dependent on the particular materials used in the construction of the OLED display. Such a transparent OLED display may be formed as a thin layer (such as a layer about 0.01 μm or thereabouts) with a metal layer or layers that has/have lower reflection and higher transmission properties as compared to higher reflective metallic materials typically used as electrodes. For example, a transparent OLED display of the mirror reflective element assembly of the present invention is preferably at least about 50 percent transmissive of visible light therethrough, more preferably at least about 65 percent transmissive of visible light therethrough, and more preferably at least about 75 percent transmissive of visible light therethrough, and is preferably substantially spectrally non-selective or untinted and presenting a water clear view therethrough, such that the

presence of the transparent OLED display is not readily discernible in front of the mirror reflector when the display is not activated or energized and when a person is viewing the mirror reflective assembly when the reflective element assembly and mirror assembly are normally mounted in the vehicle (such as shown in FIG. **37**B).

(57) When the transparent OLED display is energized (such as shown in FIG. **37**A), the transparent OLED display may display information at a display intensity of at least about 200 candelas per square meter (cd/m.sup.2) and preferably at least about 400 cd/m.sup.2, and more preferably at least about 1,000 cd/m.sup.2, so as to exhibit good contrast against the reflections off the mirror reflector therebehind when viewed by the driver of the vehicle equipped with the reflective element assembly and transparent OLED display, particularly on a sunny day. Because the transparent OLED display is disposed at the front surface of the front substrate of the reflective element assembly, the display information displayed by the transparent OLED display need not pass through a transflective mirror reflector coating at the third surface of the rear substrate, and thus the intensity of the display information is not reduced or attenuated by the mirror reflector of the mirror reflective element assembly. Optionally, and desirably, the intensity of the display may be controlled or adjusted responsive to a detected ambient light level at the mirror assembly and/or vehicle (such as responsive to an ambient light sensor of the mirror assembly of the like).

(58) Because the transparent OLED display is disposed in front of the front surface of the reflective element assembly, the third surface reflector coating **222** at the front or third surface **214***a* of rear substrate **214** need not comprise a transflective coating or layer (i.e., a metallic layer or layers that is partially transmitting of light therethrough and partially reflective of light incident thereon). However, optionally, the third surface reflector coating **222** may comprise a transflective layer and the mirror reflective element assembly may have another display element disposed behind the rear or fourth surface **214***b* of rear substrate **214** and operable to transmit display information through the third surface reflector coating **222** for viewing by a person viewing the mirror assembly when the mirror assembly and reflective element assembly are normally mounted in a vehicle.

(59) Thus, by placing a transparent OLED information display, such as a transparent OLED multipixel video display, at the front of the mirror reflective element assembly and in front of the mirror reflector, a video mirror can be formed (and may be suitable for use with the likes of a vision or imaging system of the vehicle, such as, for example, a reverse or backup aid system, such as a rearwardly directed vehicle vision system utilizing principles disclosed in U.S. Pat. Nos. 5,550,677; 5,760,962; 5,670,935; 6,201,642; 6,396,397; 6,498,620; 6,717,610 and/or 6,757,109, which are hereby incorporated herein by reference in their entireties, a trailer hitching aid or tow check system, such as the type disclosed in U.S. Pat. No. 7,005,974, which is hereby incorporated herein by reference in its entirety, a cabin viewing or monitoring device or system, such as a baby viewing or rear seat viewing camera or device or system or the like, such as disclosed in U.S. Pat. Nos. 5,877,897 and/or 6,690,268, which are hereby incorporated herein by reference in their entireties, a video communication device or system, such as disclosed in U.S. Pat. No. 6,690,268, which is hereby incorporated herein by reference in its entirety) without a need to utilize a transflective mirror reflector, and being transparent, the images and/or icons and/or characters and/or the like displayed by the transparent OLED display can be displayed on demand and appear contrasted with the reflected scene in the mirror reflective element. The presence of the transparent OLED information display device (such as a transparent OLED video display screen) in front of the mirror reflector is substantially non-discernible to a viewer viewing the mirror reflective element assembly by reason of the transparent OLED device comprising a substantially transparent substrate. Optionally, although shown and described as being disposed at the front of an electro-optic mirror reflective element assembly, a non-electro-optic mirror reflective element (such as a prismatic reflective element or a flat or curved or bent single substrate reflective element or the like) may incorporate a transparent OLED display thereat, while remaining within the spirit and scope of the present invention.

(60) Optionally, the interior rearview mirror assembly may comprise a prismatic mirror assembly or a non-electro-optic mirror assembly or an electro-optic or electrochromic mirror assembly. For example, the interior rearview mirror assembly may comprise a prismatic mirror assembly, such as the types described in U.S. Pat. Nos. 7,249,860; 6,318,870; 6,598,980; 5,327,288; 4,948,242; 4,826,289; 4,436,371 and 4,435,042; and PCT Application No. PCT/US2004/015424, filed May 18, 2004 and published on Dec. 2, 2004, as International Publication No. WO 2004/103772, which are hereby incorporated herein by reference in their entireties. Optionally, the prismatic reflective element may comprise a conventional prismatic reflective element or prism or may comprise a prismatic reflective element of the types described in U.S. Pat. Nos. 7,420,756; 7,274,501; 7,249,860; 7,338,177 and/or 7,255,451, and/or PCT Application No. PCT/US03/29776, filed Sep. 19, 2003 and published Apr. 1, 2004 as International Publication No. WO 2004/026633; and/or PCT Application No. PCT/US2004/015424, filed May 18, 2004 and published on Dec. 2, 2004, as International Publication No. WO 2004/103772; and U.S. provisional application Ser. No. 60/525,952, filed Nov. 26, 2003, which are all hereby incorporated herein by reference in their entireties, without affecting the scope of the present invention. A variety of mirror accessories and constructions are known in the art, such as those disclosed in U.S. Pat. Nos. 5,555,136; 5,582,383; 5,680,263; 5,984,482; 6,227,675; 6,229,319 and 6,315,421 (the entire disclosures of which are hereby incorporated by reference herein), that can benefit from the present invention.

(61) Optionally, the display screen and/or mirror may include user interface inputs, such as buttons or switches or touch or proximity sensors or the like, with which a user may adjust one or more characteristics of the imaging sensor and/or imaging system, such as via the principles described in U.S. patent application Ser. No. 12/091,525, filed Apr. 25, 2008, now U.S. Pat. No. 7,855,755; and/or Ser. No. 11/239,980, filed Sep. 30, 2005, now U.S. Pat. No. 7,881,496, and/or U.S. provisional applications, Ser. No. 60/614,644, filed Sep. 30, 2004; Ser. No. 60/618,686, filed Oct. 14, 2004; and Ser. No. 60/628,709, filed Nov. 17, 2004, which are hereby incorporated herein by reference in their entireties. Optionally, the images captured by the imaging sensor or camera may be processed by the control to extract information or data for different applications or systems, such as described in U.S. patent application Ser. No. 11/239,980, filed Sep. 30, 2005, now U.S. Pat. No. 7,881,496, and/or U.S. provisional application Ser. No. 60/618,686, filed Oct. 14, 2004, which are hereby incorporated herein by reference in their entireties.

(62) The control of the mirror assembly and/or the display screen may receive image data or the like from an imaging sensor or camera positioned elsewhere at or on or in the vehicle, such as at a rearward portion of the vehicle with a rearward exterior field of view, or such as at an interior portion (such as at or near or associated with the interior rearview mirror assembly or an accessory module or windshield electronics module or the like) of the vehicle with an interior field of view (such as into the vehicle cabin) or an exterior field of view (such as forwardly of and through the windshield of the vehicle). The signal from the camera or image data may be communicated to the control via various communication links or video transmission medium, such as wires or cables (such as a CAT-3 shielded twisted pair wire or a CAT-5 coaxial cable or the like) or a fiber optic cable or via wireless communication, such as IR signals or VHF or UHF signals or the like, or via a multiplex bus system of the vehicle or the like. For example, the connection or link between the imaging sensor or controls and the mirror assembly and/or display screen module may be provided via vehicle electronic or communication systems and the like, and may be connected via various protocols or nodes, such as BLUETOOTH®, SCP, UBP, J1850, CAN J2284, Fire Wire 1394, MOST, LIN, FLEXRAY™, Byte Flight and/or the like, or other vehicle-based or in-vehicle communication links or systems (such as WIFI and/or IRDA), or via wireless communications such as VHF or UHF signals, and/or the like, depending on the particular application of the mirror/display system and the vehicle.

(63) The imaging sensor or camera may provide various image data signals, such as an NTSC signal or LVDS, PAL, analog RGB, component video, SECAM, S-video or the like. Optionally, the

imaging system may be operable to selectively switch between, for example, PAL and NTSC, to adjust the imaging system and mirror/display system to accommodate European and U.S. applications.

(64) The interior rearview mirror assembly may include a bezel portion and casing, such as described above, or the mirror assembly may comprise other types of casings or bezel portions or the like, such as described in U.S. Pat. Nos. 7,249,860; 6,439,755; 4,826,289 and 6,501,387; and/or PCT Application No. PCT/US2004/015424, filed May 18, 2004 and published on Dec. 2, 2004, as International Publication No. WO 2004/103772; and/or U.S. patent applications, and/or Ser. No. 10/993,302, filed Nov. 19, 2004, now U.S. Pat. No. 7,338,177; and/or U.S. provisional application Ser. No. 60/525,952, filed Nov. 26, 2003, which are all hereby incorporated herein by reference in their entireties, without affecting the scope of the present invention. For example, the mirror assembly may comprise a flush or frameless or bezelless reflective element, such as the types described in U.S. Pat. Nos. 7,255,451; 7,274,501 and/or 7,184,190, and/or in PCT Application No. PCT/US2004/015424, filed May 18, 2004 and published on Dec. 2, 2004, as International Publication No. WO 2004/103772; PCT Application No. PCT/US03/35381, filed Nov. 5, 2003 and published May 21, 2004 as International Publication No. WO 2004/042457; and/or in U.S. patent application Ser. No. 11/140,396, filed May 27, 2005, now U.S. Pat. No. 7,360,932; Ser. No. 11/226,628, filed Sep. 14, 2005 and published Mar. 23, 2006 as U.S. Publication No. 2006/0061008; Ser. No. 11/912,576, filed Oct. 25, 2005, now U.S. Pat. No. 7,626,749; and/or Ser. No. 10/538,724, filed Jun. 13, 2005 and published Mar. 9, 2006 as U.S. Publication No. 2006/0050018; and/or in U.S. provisional applications, Ser. No. 60/563,342, filed Apr. 19, 2004; Ser. No. 60/629,926, filed Nov. 22, 2004; Ser. No. 60/624,320, filed Nov. 2, 2004; Ser. No. 60/681,250, filed May 16, 2005; Ser. No. 60/690,400, filed Jun. 14, 2005; Ser. No. 60/695,149, filed Jun. 29, 2005; and/or Ser. No. 60/730,334, filed Oct. 26, 2005, which are all hereby incorporated herein by reference in their entireties.

(65) Optionally, the mirror assembly may comprise a modular mirror construction, and may include back housing portions or the like, such as cap portions of the types described in PCT Application No. PCT/US2004/015424, filed May 18, 2004 and published on Dec. 2, 2004, as International Publication No. WO 2004/103772, which is hereby incorporated herein by reference in its entirety. The display screen may be provided as a modular display screen and may be mountable or installable in the appropriate or suitable mirror casing to provide a modular mirror assembly and display screen. For example, a rear casing or cap portion may include the display screen module including the associated components, such as the rails and motor and the like, and may be attachable to a reflective element and/or bezel portion to assemble the modular mirror assembly. The display screen module thus may be provided as an optional component or accessory for a vehicle, and may be readily assembled to a common reflective element and/or bezel portion of the mirror assembly.

(66) Optionally, the mirror casing and/or reflective element, and/or the display screen casing and/or display screen may include customized or personalized viewable characteristics, such as color or symbols or indicia selected by the vehicle manufacturer or owner of the vehicle, such as the customization characteristics described in PCT Application No. PCT/US2004/015424, filed May 18, 2004 and published on Dec. 2, 2004, as International Publication No. WO 2004/103772; and/or U.S. patent application Ser. No. 11/912,576, filed Oct. 25, 2005, now U.S. Pat. No. 7,626,749; Ser. No. 11/243,783, filed Oct. 5, 2005 and published Apr. 20, 2006 as U.S. Publication No. 2006-0082192; and/or Ser. No. 11/021,065, filed Dec. 23, 2004, now U.S. Pat. No. 7,255,451; and/or U.S. provisional applications, Ser. No. 60/553,842, filed Mar. 17, 2004; Ser. No. 60/563,342, filed Apr. 19, 2004; Ser. No. 60/629,926, filed Nov. 22, 2004; Ser. No. 60/681,250, filed May 16, 2005; Ser. No. 60/690,400, filed Jun. 14, 2005; Ser. No. 60/695,149, filed Jun. 29, 2005; Ser. No. 60/730,334, filed Oct. 26, 2005; and/or Ser. No. 60/616,182, filed Oct. 5, 2004, which are hereby incorporated herein by reference in their entireties. For example, the frame or casing of the display

module and/or the mirror assembly may be selected to have a desired color or combination of colors (or text or print or indicia thereon) to personalize the appearance of the mirror assembly. Optionally, the reflective element may include text or symbols or icons or other characters or indicia to provide a desired appearance or message at the mirror assembly or display screen, such as by utilizing aspects of the mirror assembly described in PCT Application No. PCT/US2004/015424, filed May 18, 2004 and published on Dec. 2, 2004, as International Publication No. WO 2004/103772; and/or U.S. patent application Ser. No. 11/912,576, filed Oct. 25, 2005, now U.S. Pat. No. 7,626,749; Ser. No. 11/243,783, filed Oct. 5, 2005 and published Apr. 20, 2006 as U.S. Publication No. 2006-0082192, which are hereby incorporated herein by reference in their entireties. The icons or characters or indicia may be formed at or near or on the display screen, or may be provided via graphic overlays when the display screen is extended and operating, or may otherwise be formed or provided at or on or in the display screen casing or frame, without affecting the scope of the present invention. Optionally, the bezel or frame color or colors may be selected to be designer colors or may match or contrast the color of the mirror casing, and/or may have logos or icons or other indicia thereon. Optionally, the display screen module may include warnings or other statements or alerts or messages printed or otherwise formed on the bezel or frame portion of the display screen so that the messages or the like are readily viewable when the display screen is extended.

(67) Optionally, the mirror assembly and/or prismatic or electrochromic reflective element may include one or more displays, such as for the accessories or circuitry described herein. The displays may be similar to those described above, or may be of types disclosed in U.S. Pat. Nos. 5,530,240 and/or 6,329,925, which are hereby incorporated herein by reference in their entireties, and/or may be display-on-demand or transflective type displays, such as the types disclosed in U.S. Pat. Nos. 7,195,381; 6,690,298; 5,668,663 and/or 5,724,187, and/or in U.S. patent application Ser. No. 11/226,628, filed Sep. 14, 2005 and published Mar. 23, 2006 as U.S. Publication No. 2006/0061008; and/or Ser. No. 10/993,302, filed Nov. 19, 2004, now U.S. Pat. No. 7,338,177; and/or in U.S. provisional applications, Ser. No. 60/525,952, filed Nov. 26, 2003; Ser. No. 60/717,093, filed Sep. 14, 2005; and/or Ser. No. 60/732,245, filed Nov. 1, 2005, and/or in PCT Application No. PCT/US03/29776, filed Sep. 19, 2003 and published Apr. 1, 2004 as International Publication No. WO 2004/026633, which are all hereby incorporated herein by reference in their entireties. Optionally, a prismatic reflective element may comprise a display on demand or transflective prismatic element (such as described in PCT Application No. PCT/US03/29776, filed Sep. 19, 2003 and published Apr. 1, 2004 as International Publication No. WO 2004/026633; and/or U.S. patent application Ser. No. 10/993,302, filed Nov. 19, 2004, now U.S. Pat. No. 7,338,177; and/or U.S. provisional application Ser. No. 60/525,952, filed Nov. 26, 2003, which are all hereby incorporated herein by reference in their entireties) so that the displays are viewable through the reflective element, while the display area still functions to substantially reflect light, in order to provide a generally uniform prismatic reflective element even in the areas that have display elements positioned behind the reflective element.

(68) Optionally, the display and any associated user inputs may be associated with various accessories or systems, such as, for example, a tire pressure monitoring system or a passenger air bag status or a garage door opening system or a telematics system or any other accessory or system of the mirror assembly or of the vehicle or of an accessory module or console of the vehicle, such as an accessory module or console of the types described in U.S. Pat. Nos. 6,877,888; 6,824,281; 6,690,268; 6,672,744; 6,386,742 and 6,124,886, and/or, and/or PCT Application No. PCT/US03/03012, filed Jan. 31, 2003 and published Aug. 7, 2003 as International Publication No. WO 03/065084, and/or PCT Application No. PCT/US03/40611, filed Dec. 19, 2003 and published Jul. 15, 2004 as International Publication No. WO 2004/058540, and/or PCT Application No. PCT/US04/15424, filed May 18, 2004 and published on Dec. 2, 2004, as International Publication No. WO 2004/103772, which are hereby incorporated herein by reference in their entireties.

(69) Optionally, the user inputs of the mirror assembly or display or module may comprise other types of buttons or switches for controlling or activating/deactivating one or more electrical accessories or devices of or associated with the mirror assembly. The mirror assembly may comprise any type of switches or buttons, such as touch or proximity sensing switches, such as touch or proximity switches of the types described above, or the inputs may comprise other types of buttons or switches, such as those described in U.S. patent application Ser. No. 11/029,695, filed Jan. 5, 2005, now U.S. Pat. No. 7,253,723; and/or U.S. provisional applications, Ser. No. 60/553,517, filed Mar. 16, 2004; Ser. No. 60/535,559, filed Jan. 9, 2004; Ser. No. 60/690,401, filed Jun. 14, 2005; and Ser. No. 60/719,482, filed Sep. 22, 2005, which are hereby incorporated herein by reference in their entireties, or such as fabric-made position detectors, such as those described in U.S. Pat. Nos. 6,504,531; 6,501,465; 6,492,980; 6,452,479; 6,437,258 and 6,369,804, which are hereby incorporated herein by reference in their entireties. For example, the inputs may comprise a touch or proximity sensor of the types commercially available from TouchSensor Technologies, LLC of Wheaton, IL. The touch or proximity sensor may be operable to generate an electric field and to detect the presence of a conductive mass entering the field. When a voltage is applied to the sensor, the sensor generates the electric field, which emanates through any dielectric material, such as plastic or the like, at the sensor. When a conductive mass (such as a person's finger or the like, or metal or the like) enters the electric field, the sensor may detect a change in the field and may indicate such a detection. Other types of switches or buttons or inputs or sensors may be incorporated to provide the desired function, without affecting the scope of the present invention.
(70) Optionally, the user inputs or buttons may comprise user inputs for a garage door opening system, such as a vehicle based garage door opening system of the types described in U.S. Pat. Nos. 6,396,408; 6,362,771; 7,023,322 and 5,798,688, and/or U.S. provisional applications, Ser. No. 60/502,806, filed Sep. 12, 2003; and Ser. No. 60/444,726, filed Feb. 4, 2003, which are hereby incorporated herein by reference in their entireties. The user inputs may also or otherwise function to activate and deactivate a display or function or accessory, and/or may activate/deactivate and/or commence a calibration of a compass system of the mirror assembly and/or vehicle. The compass system may include compass sensors and circuitry within the mirror assembly or within a compass pod or module at or near or associated with the mirror assembly. Optionally, the user inputs may also or otherwise comprise user inputs for a telematics system of the vehicle, such as, for example, an ONSTAR® system as found in General Motors vehicles and/or such as described in U.S. Pat. Nos. 4,862,594; 4,937,945; 5,131,154; 5,255,442; 5,632,092; 5,798,688; 5,971,552; 5,924,212; 6,243,003; 6,278,377 and 6,420,975; 6,477,464; 6,946,978; 7,308,341; 7,167,796; 7,004,593 and/or 6,678,614, and/or PCT Application No. PCT/US03/40611, filed Dec. 19, 2003 and published Jul. 15, 2004 as International Publication No. WO 2004/058540, and/or PCT Application No. PCT/US03/308877, filed Oct. 1, 2003 and published Apr. 15, 2004 as International Publication No. WO 2004/032568, which are all hereby incorporated herein by reference in their entireties.
(71) Optionally, the mirror assembly may include one or more other accessories at or within the mirror casing, such as one or more electrical or electronic devices or accessories, such as antennas, including global positioning system (GPS) or cellular phone antennas, such as disclosed in U.S. Pat. No. 5,971,552, a communication module, such as disclosed in U.S. Pat. No. 5,798,688, a blind spot detection system, such as disclosed in U.S. Pat. Nos. 5,929,786 and/or 5,786,772, transmitters and/or receivers, such as a garage door opener or the like, a digital network, such as described in U.S. Pat. No. 5,798,575, a high/low headlamp controller, such as disclosed in U.S. Pat. Nos. 5,796,094 and/or 5,715,093, a memory mirror system, such as disclosed in U.S. Pat. No. 5,796,176, a hands-free phone attachment, a video device for internal cabin surveillance and/or video telephone function, such as disclosed in U.S. Pat. Nos. 5,760,962 and/or 5,877,897, a remote keyless entry receiver, lights, such as map reading lights or one or more other lights or illumination sources, such as disclosed in U.S. Pat. Nos. 6,690,268; 5,938,321; 5,813,745; 5,820,245; 5,673,994; 5,649,756; 5,178,448; 5,671,996; 4,646,210; 4,733,336; 4,807,096; 6,042,253;

5,669,698; 7,195,381; 6,971,775 and/or 7,249,860, microphones, such as disclosed in U.S. Pat. Nos. 6,243,003; 6,278,377 and/or 6,420,975; and/or U.S. patent application Ser. No. 10/529,715, filed Mar. 30, 2005, now U.S. Pat. No. 7,657,052; and/or PCT Application No. PCT/US03/30877, filed Oct. 1, 2003, and published Apr. 15, 2004 as International Publication No. WO 2004/032568, speakers, antennas, including global positioning system (GPS) or cellular phone antennas, such as disclosed in U.S. Pat. No. 5,971,552, a communication module, such as disclosed in U.S. Pat. No. 5,798,688, a voice recorder, a blind spot detection system, such as disclosed in U.S. Pat. Nos. 5,929,786 and/or 5,786,772, and/or U.S. patent application Ser. No. 10/427,051, filed Apr. 30, 2003, now U.S. Pat. No. 7,038,577; and Ser. No. 10/209,173, filed Jul. 31, 2002, now U.S. Pat. No. 6,882,287; and/or U.S. provisional application Ser. No. 60/638,687, filed Dec. 23, 2004, transmitters and/or receivers, such as for a garage door opener or a vehicle door unlocking system or the like (such as a remote keyless entry system), a digital network, such as described in U.S. Pat. No. 5,798,575, a high/low headlamp controller, such as a camera-based headlamp control, such as disclosed in U.S. Pat. Nos. 5,796,094 and/or 5,715,093, a memory mirror system, such as disclosed in U.S. Pat. No. 5,796,176, a hands-free phone attachment, an imaging system or components or circuitry or display thereof, such as an imaging and/or display system of the types described in U.S. Pat. Nos. 6,690,268 and 6,847,487; and/or U.S. provisional applications, Ser. No. 60/614,644, filed Sep. 30, 2004; Ser. No. 60/618,686, filed Oct. 14, 2004; Ser. No. 60/628,709, filed Nov. 17, 2004; Ser. No. 60/644,903, filed Jan. 11, 2005; Ser. No. 60/667,049, filed Mar. 31, 2005; and/or U.S. patent application Ser. No. 11/105,757, filed Apr. 14, 2005, now U.S. Pat. No. 7,526,103, a video device for internal cabin surveillance (such as for sleep detection or driver drowsiness detection or the like) and/or video telephone function, such as disclosed in U.S. Pat. Nos. 5,760,962 and/or 5,877,897, a remote keyless entry receiver, a seat occupancy detector, a remote starter control, a yaw sensor, a clock, a carbon monoxide detector, status displays, such as displays that display a status of a door of the vehicle, a transmission selection (4wd/2wd or traction control (TCS) or the like), an antilock braking system, a road condition (that may warn the driver of icy road conditions) and/or the like, a trip computer, a tire pressure monitoring system (TPMS) receiver (such as described in U.S. Pat. Nos. 6,124,647; 6,294,989; 6,445,287; 6,472,979; 6,731,205 and/or 7,423,522, and/or U.S. provisional application Ser. No. 60/611,796, filed Sep. 21, 2004), and/or an ONSTAR® system, a compass, such as disclosed in U.S. Pat. Nos. 5,924,212; 4,862,594; 4,937,945; 5,131,154; 5,255,442 and/or 5,632,092, an alert system and/or components or elements thereof (such as described in U.S. provisional applications, Ser. No. 61/180,257, filed May 21, 2009; Ser. No. 61/156,184, filed Feb. 27, 2009; and Ser. No. 61/174,596, filed May 1, 2009, which are hereby incorporated herein by reference in their entireties), and/or any other accessory or circuitry or the like (with all of the above-referenced patents and PCT and U.S. patent applications being commonly assigned, and with the disclosures of the referenced patents and patent applications being hereby incorporated herein by reference in their entireties).

(72) Optionally, the accessory or accessories, such as those described above and/or below, may be positioned at or within the mirror casing and may be included on or integrated in a printed circuit board positioned within the mirror casing, such as along a rear surface of the reflective element or elsewhere within a cavity defined by the casing, without affecting the scope of the present invention. The user actuatable inputs and/or touch sensors and/or proximity sensors and displays described above may be actuatable to control and/or adjust the accessories of the mirror assembly/system and/or overhead console and/or accessory module and/or vehicle. The connection or link between the controls and the display screen device and/or the navigation system and/or other systems and accessories of the mirror system may be provided via vehicle electronic or communication systems and the like, and may be connected via various protocols or nodes, such as BLUETOOTH®, SCP, UBP, J1850, CAN J2284, Fire Wire 1394, MOST, LIN, FLEXRAY™, Byte Flight and/or the like, or other vehicle-based or in-vehicle communication links or systems (such as WIFI and/or IRDA) and/or the like, or via VHF or UHF or other wireless transmission formats,

depending on the particular application of the mirror/accessory system and the vehicle. Optionally, the connections or links may be provided via various wireless connectivity or links, without affecting the scope of the present invention.
(73) Changes and modifications in the specifically described embodiments may be carried out without departing from the principles of the present invention, which is intended to be limited only by the scope of the appended claims as interpreted according to the principles of patent law.

Claims

1. A vehicular video camera display system, the vehicular video camera display system comprising: an interior rearview mirror assembly disposed at an in-cabin side of a windshield of a vehicle equipped with the vehicular video camera display system; wherein the interior rearview mirror assembly comprises a mirror head accommodating an electrochromic reflective element; wherein the electrochromic reflective element comprises a front glass substrate and a rear glass substrate with an electrochromic medium sandwiched therebetween; wherein the front glass substrate comprises a planar first side and a planar second side separated by a thickness of the front glass substrate, and wherein a transparent electrically conductive coating is disposed at the planar second side of the front glass substrate; wherein the rear glass substrate comprises a planar third side and a planar fourth side separated by a thickness of the rear glass substrate, and wherein a mirror reflector is disposed at the planar third side of the rear glass substrate; wherein the electrochromic medium is disposed in a cavity between the planar second side of the front glass substrate and the planar third side of the rear glass substrate; wherein the cavity is established by a seal that spaces the planar second side of the front glass substrate from the planar third side of the rear glass substrate; wherein the electrochromic medium contacts the transparent electrically conductive coating disposed at the planar second side of the front glass substrate and contacts the mirror reflector disposed at the planar third side of the rear glass substrate; wherein the mirror reflector disposed at the planar third side of the electrochromic reflective element comprises a transflective mirror reflector that at least partially reflects light incident thereon and that at least partially transmits incident light therethrough; wherein a video display device is disposed in the mirror head behind the electrochromic reflective element; wherein, with the interior rearview mirror assembly disposed at the in-cabin side of the windshield of the equipped vehicle, a video display screen of the video display device is operable to display video images that are viewable through the electrochromic reflective element by a driver of the equipped vehicle who is viewing the interior rearview mirror assembly disposed at the in-cabin side of the windshield of the equipped vehicle; a rearward-viewing video camera disposed at the equipped vehicle; the rearward-viewing video camera viewing at least rearward of the equipped vehicle; the rearward-viewing video camera comprising a CMOS imaging array sensor operable to capture image data; wherein image data captured by the rearward-viewing video camera is provided to and processed at control circuitry; wherein the control circuitry links to a vehicular bus network system of the equipped vehicle; wherein image data captured by the rearward-viewing video camera is communicated as a digital signal from the rearward-viewing video camera via a cable to the control circuitry; wherein the cable comprises a coaxial cable; wherein the interior rearview mirror assembly comprises a video device operable for surveillance of an internal cabin of the equipped vehicle; wherein the video display device displays video images that are derived, at least in part, from image data communicated via the cable from the rearward-viewing video camera to the control circuitry; and wherein the control circuitry controls display at the video display device of the video images derived, at least in part, from image data communicated via the cable from the rearward-viewing video camera to the control circuitry.
2. The vehicular video camera display system of claim 1, wherein no part of the rear glass substrate extends beyond any part of the front glass substrate.

3. The vehicular video camera display system of claim 1, wherein the vehicular bus network system of the equipped vehicle comprises a Local Interconnect Network (LIN).
4. The vehicular video camera display system of claim 1, wherein the vehicular bus network system of the equipped vehicle comprises a Controller Area Network (CAN).
5. The vehicular video camera display system of claim 1, wherein the control circuitry is operable to generate at least one graphic overlay that is electronically generated and is superimposed on video images displayed at the video display device that are derived, at least in part, from the image data communicated via the cable from the rearward-viewing video camera to the control circuitry.
6. The vehicular video camera display system of claim 1, wherein the control circuitry has Universal Asynchronous Receiver/Transmitter (UART) capability.
7. The vehicular video camera display system of claim 1, wherein the control circuitry has Inter-Integrated Circuit (I.sup.2C) capability.
8. The vehicular video camera display system of claim 1, wherein the control circuitry has Serial Peripheral Interface (SPI) capability.
9. The vehicular video camera display system of claim 1, wherein the control circuitry is disposed at the interior rearview mirror assembly.
10. The vehicular video camera display system of claim 9, wherein the control circuitry comprises circuitry operable to control dimming of the electrochromic reflective element.
11. The vehicular video camera display system of claim 10, wherein the interior rearview mirror assembly includes (i) a glare light sensor for sensing glare light at the electrochromic reflective element and (ii) an ambient light sensor for sensing ambient light at the interior rearview mirror assembly, and wherein the control circuitry controls dimming of the electrochromic reflective element responsive to sensing of glare light by the glare light sensor and to sensing of ambient light by the ambient light sensor.
12. The vehicular video camera display system of claim 10, wherein the control circuitry, when the electrochromic reflective element is dimmed from a higher reflectivity state to a lower reflectivity state, increases display luminance of video images displayed at the video display device for viewing by the driver of the equipped vehicle.
13. The vehicular video camera display system of claim 1, wherein the control circuitry comprises a decoder that decodes the digital signal communicated from the rearward-viewing video camera via the cable.
14. The vehicular video camera display system of claim 13, wherein the decoder interfaces with the vehicular bus network system of the equipped vehicle.
15. The vehicular video camera display system of claim 1, wherein the video display screen comprises a liquid crystal video display screen, and wherein the control circuitry controls at least one light emitting diode to provide backlighting of the liquid crystal video display screen.
16. The vehicular video camera display system of claim 15, wherein the rearward-viewing video camera comprises a rear backup camera of the equipped vehicle.
17. The vehicular video camera display system of claim 1, wherein the control circuitry is operable to generate information that is superimposed on the video images displayed at the video display device that are derived, at least in part, from image data communicated via the cable from the rearward-viewing video camera to the control circuitry.
18. The vehicular video camera display system of claim 17, wherein the control circuitry is operable to generate textual information that is superimposed on the video images displayed at the video display device that are derived, at least in part, from the communication via the cable of captured image data from the rearward-viewing video camera to the control circuitry.
19. The vehicular video camera display system of claim 1, wherein the video display screen comprises an organic light emitting diode (OLED) video display screen.
20. The vehicular video camera display system of claim 1, wherein the control circuitry is operable to control display at the video display device of video images that have a display luminance greater

than 700 cd/m.sup.2.
21. The vehicular video camera display system of claim 1, wherein communication via the cable of captured image data from the rearward-viewing video camera to the control circuitry uses low-voltage differential signaling (LVDS).
22. The vehicular video camera display system of claim 1, wherein the video device, when operated, detects driver drowsiness.
23. The vehicular video camera display system of claim 1, wherein the coaxial cable comprises a CAT-5 coaxial cable.
24. A vehicular video camera display system, the vehicular video camera display system comprising: an interior rearview mirror assembly disposed at an in-cabin side of a windshield of a vehicle equipped with the vehicular video camera display system; wherein the interior rearview mirror assembly comprises a mirror head accommodating an electrochromic reflective element; wherein the electrochromic reflective element comprises a front glass substrate and a rear glass substrate with an electrochromic medium sandwiched therebetween; wherein the front glass substrate comprises a planar first side and a planar second side separated by a thickness of the front glass substrate, and wherein a transparent electrically conductive coating is disposed at the planar second side of the front glass substrate; wherein the rear glass substrate comprises a planar third side and a planar fourth side separated by a thickness of the rear glass substrate, and wherein a mirror reflector is disposed at the planar third side of the rear glass substrate; wherein no part of the rear glass substrate extends beyond any part of the front glass substrate; wherein the electrochromic medium is disposed in a cavity between the planar second side of the front glass substrate and the planar third side of the rear glass substrate; wherein the cavity is established by a seal that spaces the planar second side of the front glass substrate from the planar third side of the rear glass substrate; wherein the electrochromic medium contacts the transparent electrically conductive coating disposed at the planar second side of the front glass substrate and contacts the mirror reflector disposed at the planar third side of the rear glass substrate; wherein the mirror reflector disposed at the planar third side of the electrochromic reflective element comprises a transflective mirror reflector that at least partially reflects light incident thereon and that at least partially transmits incident light therethrough; wherein a video display device is disposed in the mirror head behind the electrochromic reflective element; wherein, with the interior rearview mirror assembly disposed at the in-cabin side of the windshield of the equipped vehicle, a video display screen of the video display device is operable to display video images that are viewable through the electrochromic reflective element by a driver of the equipped vehicle who is viewing the interior rearview mirror assembly disposed at the in-cabin side of the windshield of the equipped vehicle; a rearward-viewing video camera disposed at the equipped vehicle; the rearward-viewing video camera viewing at least rearward of the equipped vehicle; the rearward-viewing video camera comprising a CMOS imaging array sensor operable to capture image data; wherein image data captured by the rearward-viewing video camera is provided to and processed at control circuitry; wherein the control circuitry links to a vehicular bus network system of the equipped vehicle; wherein the control circuitry comprises circuitry operable to control dimming of the electrochromic reflective element; wherein image data captured by the rearward-viewing video camera is communicated as a digital signal from the rearward-viewing video camera via a cable to the control circuitry; wherein the cable comprises a coaxial cable; wherein the interior rearview mirror assembly comprises a video device operable for surveillance of an internal cabin of the equipped vehicle; wherein the video display device displays video images that are derived, at least in part, from image data communicated via the cable from the rearward-viewing video camera to the control circuitry; and wherein the control circuitry controls display at the video display device of the video images derived, at least in part, from image data communicated via the cable from the rearward-viewing video camera to the control circuitry.
25. The vehicular video camera display system of claim 24, wherein the vehicular bus network

system of the equipped vehicle comprises a Controller Area Network (CAN).
26. The vehicular video camera display system of claim 24, wherein the control circuitry is operable to generate at least one graphic overlay that is electronically generated and is superimposed on video images displayed at the video display device that are derived, at least in part, from the image data communicated via the cable from the rearward-viewing video camera to the control circuitry.
27. The vehicular video camera display system of claim 24, wherein the control circuitry is disposed at the interior rearview mirror assembly.
28. The vehicular video camera display system of claim 24, wherein the interior rearview mirror assembly includes (i) a glare light sensor for sensing glare light at the electrochromic reflective element and (ii) an ambient light sensor for sensing ambient light at the interior rearview mirror assembly, and wherein the control circuitry controls dimming of the electrochromic reflective element responsive to sensing of glare light by the glare light sensor and to sensing of ambient light by the ambient light sensor.
29. The vehicular video camera display system of claim 24, wherein the control circuitry, when the electrochromic reflective element is dimmed from a higher reflectivity state to a lower reflectivity state, increases display luminance of video images displayed at the video display device for viewing by the driver of the equipped vehicle.
30. The vehicular video camera display system of claim 24, wherein the control circuitry comprises a decoder that decodes the digital signal communicated from the rearward-viewing video camera via the cable, and wherein the decoder interfaces with the vehicular bus network system of the equipped vehicle.
31. The vehicular video camera display system of claim 24, wherein the video display screen comprises a liquid crystal video display screen, and wherein the control circuitry controls at least one light emitting diode to provide backlighting of the liquid crystal video display screen.
32. The vehicular video camera display system of claim 31, wherein the rearward-viewing video camera comprises a rear backup camera of the equipped vehicle.
33. The vehicular video camera display system of claim 24, wherein the control circuitry is operable to generate information that is superimposed on the video images displayed at the video display device that are derived, at least in part, from image data communicated via the cable from the rearward-viewing video camera to the control circuitry.
34. The vehicular video camera display system of claim 24, wherein communication via the cable of captured image data from the rearward-viewing video camera to the control circuitry uses low-voltage differential signaling (LVDS).
35. The vehicular video camera display system of claim 24, wherein the video device, when operated, detects driver drowsiness.
36. The vehicular video camera display system of claim 24, wherein the coaxial cable comprises a CAT-5 coaxial cable.
37. A vehicular video camera display system, the vehicular video camera display system comprising: an interior rearview mirror assembly disposed at an in-cabin side of a windshield of a vehicle equipped with the vehicular video camera display system; wherein the interior rearview mirror assembly comprises a mirror head accommodating an electrochromic reflective element; wherein the electrochromic reflective element comprises a front glass substrate and a rear glass substrate with an electrochromic medium sandwiched therebetween; wherein the front glass substrate comprises a planar first side and a planar second side separated by a thickness of the front glass substrate, and wherein a transparent electrically conductive coating is disposed at the planar second side of the front glass substrate; wherein the rear glass substrate comprises a planar third side and a planar fourth side separated by a thickness of the rear glass substrate, and wherein a mirror reflector is disposed at the planar third side of the rear glass substrate; wherein the electrochromic medium is disposed in a cavity between the planar second side of the front glass

substrate and the planar third side of the rear glass substrate; wherein the cavity is established by a seal that spaces the planar second side of the front glass substrate from the planar third side of the rear glass substrate; wherein the electrochromic medium contacts the transparent electrically conductive coating disposed at the planar second side of the front glass substrate and contacts the mirror reflector disposed at the planar third side of the rear glass substrate; wherein the mirror reflector disposed at the planar third side of the electrochromic reflective element comprises a transflective mirror reflector that at least partially reflects light incident thereon and that at least partially transmits incident light therethrough; wherein a video display device is disposed in the mirror head behind the electrochromic reflective element; wherein, with the interior rearview mirror assembly disposed at the in-cabin side of the windshield of the equipped vehicle, a video display screen of the video display device is operable to display video images that are viewable through the electrochromic reflective element by a driver of the equipped vehicle who is viewing the interior rearview mirror assembly disposed at the in-cabin side of the windshield of the equipped vehicle; a rearward-viewing video camera disposed at the equipped vehicle; the rearward-viewing video camera viewing at least rearward of the equipped vehicle; the rearward-viewing video camera comprising a CMOS imaging array sensor operable to capture image data; wherein image data captured by the rearward-viewing video camera is provided to and processed at control circuitry; wherein the control circuitry links to a vehicular bus network system of the equipped vehicle; wherein image data captured by the rearward-viewing video camera is communicated as a digital signal from the rearward-viewing video camera via a cable to the control circuitry; wherein the cable comprises a coaxial cable; wherein the control circuitry comprises a decoder that decodes the digital signal communicated from the rearward-viewing video camera via the cable; wherein the video display screen comprises a liquid crystal video display screen, and wherein the control circuitry controls at least one light emitting diode to provide backlighting of the liquid crystal video display screen; wherein the interior rearview mirror assembly comprises a video device operable for surveillance of an internal cabin of the equipped vehicle; wherein the video display device displays video images that are derived, at least in part, from image data communicated via the cable from the rearward-viewing video camera to the control circuitry; and wherein the control circuitry controls display at the video display device of the video images derived, at least in part, from image data communicated via the cable from the rearward-viewing video camera to the control circuitry.

38. The vehicular video camera display system of claim 37, wherein the vehicular bus network system of the equipped vehicle comprises a Controller Area Network (CAN).

39. The vehicular video camera display system of claim 37, wherein the control circuitry is operable to generate at least one graphic overlay that is electronically generated and is superimposed on video images displayed at the video display device that are derived, at least in part, from the image data communicated via the cable from the rearward-viewing video camera to the control circuitry.

40. The vehicular video camera display system of claim 37, wherein the control circuitry is disposed at the interior rearview mirror assembly.

41. The vehicular video camera display system of claim 40, wherein the control circuitry comprises circuitry operable to control dimming of the electrochromic reflective element.

42. The vehicular video camera display system of claim 41, wherein the interior rearview mirror assembly includes (i) a glare light sensor for sensing glare light at the electrochromic reflective element and (ii) an ambient light sensor for sensing ambient light at the interior rearview mirror assembly, and wherein the control circuitry controls dimming of the electrochromic reflective element responsive to sensing of glare light by the glare light sensor and to sensing of ambient light by the ambient light sensor.

43. The vehicular video camera display system of claim 41, wherein the control circuitry, when the electrochromic reflective element is dimmed from a higher reflectivity state to a lower reflectivity state, increases display luminance of video images displayed at the video display device for

viewing by the driver of the equipped vehicle.
44. The vehicular video camera display system of claim 37, wherein the decoder interfaces with the vehicular bus network system of the equipped vehicle.
45. The vehicular video camera display system of claim 37, wherein the rearward-viewing video camera comprises a rear backup camera of the equipped vehicle.
46. The vehicular video camera display system of claim 37, wherein the control circuitry is operable to generate information that is superimposed on the video images displayed at the video display device that are derived, at least in part, from image data communicated via the cable from the rearward-viewing video camera to the control circuitry.
47. The vehicular video camera display system of claim 37, wherein communication via the cable of captured image data from the rearward-viewing video camera to the control circuitry uses low-voltage differential signaling (LVDS).
48. The vehicular video camera display system of claim 37, wherein the video device, when operated, detects driver drowsiness.
49. The vehicular video camera display system of claim 37, wherein the coaxial cable comprises a CAT-5 coaxial cable.