

Media/DVI Converters

Convert and output video signals of one or more video sources (computer, CPU, camera, or DVD player) in DVI-D format.



**Customer
Support
Information**

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax
724-746-0746 • Mailing address: Black Box Corporation, 1000 Park Drive, Lawrence,
PA 15055-1018 • Web site: www.blackbox.com • E-mail: info@blackbox.com

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Trademarks Used in this Manual

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FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Normas Oficiales Mexicanas (NOM) Electrical Safety Statement INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

WEEE, RoHS, and Safety Instructions

WEEE

The manufacturer complies with the EC Directive 2002/96/EG on the prevention of waste electrical and electronic equipment (WEEE).

The device labels carry a respective marking.

RoHS

This device complies with the EC Directive 2002/95/EG on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

The device labels carry a respective marking.

Safety Instructions

To ensure reliable and safe long-term operation of your DVI Converter, note the following guidelines:

Installation

- Only use in dry, indoor environments.
- The DVI Converter and the power supply units can get warm. Do not place them in an enclosed space without any airflow.
- Do not place the power supply directly on top of the device.
- Do not obscure ventilation holes.
- Only use power supplies originally supplied with the product or manufacturer-approved replacements. Do not use a power supply if it appears to be defective or has a damaged case.
- Connect all power supplies to grounded outlets. In each case, make sure that the ground connection is maintained from the outlet socket through to the power supply's AC power input.
- Do not connect the link interface to any other equipment, particularly network or telecommunications equipment.
- Take any required ESD precautions.

Repair

- Do not attempt to open or repair a power supply unit.
- Do not attempt to open or repair the DVI Converter. There are no user serviceable parts inside.
- Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com if there is a fault.

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1. Specifications

1.1 General

Operating System Support — Any

Computer Interface — ACS411A-R2: VGA, DVI;

ACS412A: S-Video, Component, Composite, EGA, VGA;

ACS413A: S-Video, Component, Composite, SDI, HDSDI, DVI-D;

ACS414A: RGBHV

User Interface — IR Remote

Connectors — ACS411A-R2: (1) VGA/DVI-I input, (1) DVI-D output,

(1) 2.1-mm barrel connector, (1) Mini USB connector PROG port;

ACS412A: (1) S-Video input, (3) RCA for Component input, (1) DB9 EGA

male input, (1) VGA/DVI-I connector, (1) Mini USB connector PROG port;

ACS413A: (1) S-Video input, (3) RCA for Component input, (1) BNC female

for FBAS4, (1) BNC female for (HD) SDI, (1) VGA/DVI-I connector,

(1) DVI-D female, (1) 2.1-mm barrel connector, (1) Mini USB connector
PROG port;

ACS414A: (5) BNC, RGBHV inputs, (1) VGA/DVI-I connector, (1) DVI-D female,

(1) 2.1-mm barrel connector, (1) Mini USB connector PROG port

Indicators — (1) multicolor Status LED

Temperature Tolerance — Operating: +41 to +113° F (+5 to +45° C);

Storage: -13 to +140° F (-25 to +60° C)

Relative Humidity — Maximum: 80% noncondensing

Power — ACS411A-R2: 5-VDC external power supply, 900 mA;

ACS412A–ACS414A: 5-VDC external power supply, 1100 mA

Size — ACS411A-R2: 4"H x 5.6"W x 1.1"D (10.3 x 14.3 x 2.9 cm);

ACS412A–ACS414A: 4"H x 5.6"W x 1.7"D (10.3 x 14.3 x 4.3 cm)

Weight — ACS411A-R2: 0.7 lb. (0.3 kg);

ACS412A–ACS414A: 0.9 lb. (0.4 kg)

1.2 Supported Video Modes

Table 1-1 lists supported video modes for DVI, VGA, EGA, and RGB; Table 1-2 lists supported video modes for Component/Composite Video, S-Video, and SDI.

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Table 1-1. Supported video modes for DVI, VGA, EGA, and RGB.

Index	Description	Hres	Vres	V-Freq	H-Freq	Dot Clk
17	CGA (TTL)	320	200	59.9	15.7	7.2
10	PAL	416	574	50.0	15.6	8.0
36	MONA S5	442	416	54.4	24.3	14.0
4	AS 230/235/OS 252	448	288	50.0	15.6	10.0
5	GBE 3977-62x32	448	288	50.0	15.6	10.0
18	DCC 555a	504	280	50.2	15.7	10.0
15	WF470	512	240	49.1	15.6	12.0
6	WF470	512	245	50.0	15.6	12.0
7	WF470/AS215	512	256	50.0	15.6	12.0
60	WF470/AS215	512	512	50.1	31.3	24.0
12	GEM 80 graph i	560	224	25.0	15.6	11.7
24	GEM 80 graph i	560	224	30.1	15.8	11.9
28	GEM 80 graph i	560	224	37.5	18.2	12.0
45	750b	560	248	41.6	26.0	20.0
8	GBE3977 - 80 x 48	560	288	50.0	15.6	13.0
9	DISET — 80 x 25	560	288	50.0	15.6	12.2
19	DCS 560	560	288	50.0	15.7	11.4
44	MONA-C	560	413	58.2	25.8	20.0
61	GEM 80 graph progr.	560	448	50.1	31.3	23.5
64	GEM 80 graph progr.	560	448	60.0	31.5	23.7
79	GEM 80 graph progr.	560	448	75.1	36.4	24.0
53	WF480	580	480	59.9	30.6	25.0
22	CGA (TTL)	640	200	59.9	15.7	14.3
3	CP526/527	640	234	50.0	15.4	13.1
16	GEM 80 text	640	288	48.8	15.6	13.0
47	Prokon 2	640	288	83.0	27.4	23.0
34	EGA (TTL)	640	350	59.8	21.9	16.3

Table 1-1 (Continued). Supported video modes for DVI, VGA, EGA, and RGB.

Index	Description	Hres	Vres	V-Freq	H-Freq	Dot Clk
162	VGA	640	350	70.2	31.5	25.2
166	VGA	640	350	84.9	37.8	31.4
33	IVE 3	640	379	50.1	21.8	17.4
30	IVE 4	640	385	50.0	20.0	16.1
32	Custom 1	640	385	49.9	20.6	16.5
39	ABB MOD 300	640	385	60.0	24.8	19.8
35	IVE 2	640	398	50.0	21.9	17.8
52	NEC 3D PGC	640	398	59.6	30.3	25.0
70	XGA2	640	398	77.4	39.3	32.4
37	VGA	640	400	55.9	24.6	20.9
49	OP 398 K	640	400	60.0	27.5	22.2
164	VGA	640	400	70.2	31.5	25.2
168	VGA	640	400	84.9	37.8	31.4
38	COROS LS-C	640	405	59.1	25.4	21.7
40	COROS LS-C	640	405	59.1	25.4	21.7
42	Prokon 1	640	432	53.8	25.5	23.1
48	Prokon 3	640	432	58.9	27.4	23.0
56	CP526 high res.	640	468	60.0	30.0	26.2
57	CP528 high res.	640	468	60.0	30.9	28.3
59	CP526 high res.	640	468	50.0	31.2	28.2
54	WF480/Gracis	640	480	59.9	30.6	27.6
55	DAMATIC	640	480	59.2	30.8	25.9
63	VESA Standard	640	480	60.0	31.5	25.2
74	MAC Mode	640	480	66.7	35.0	31.4
75	MAC Mode	640	480	66.9	35.1	30.3
81	VESA Standard	640	480	75.0	37.4	31.5
83	VESA Standard	640	480	72.7	37.8	31.4

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Table 1-1 (Continued). Supported video modes for DVI, VGA, EGA, and RGB.

Index	Description	Hres	Vres	V-Freq	H-Freq	Dot Clk
85	VESA Standard	640	480	72.9	37.9	31.5
87	VESA Standard	640	480	84.9	43.2	35.9
1	NEC 15 kHz	642	200	60.0	15.0	13.5
2	NEC 15 kHz i	642	200	30.0	15.0	13.5
65	Std.–VGA	656	496	60.0	31.5	25.2
86	NEC 42.5 kHz	677	550	70.0	42.5	37.4
20	NTSC (halfline)	680	240	59.9	15.7	12.9
23	NTSC	680	480	59.9	15.7	12.9
25	NTSC Interlaced	720	240	30.1	15.8	13.6
11	PAL Interlaced	720	288	25.0	15.6	13.5
27	ABB DSAV110	720	336	50.1	17.9	15.6
29	Hercules Monochrom	720	350	49.7	18.4	16.2
72	XGA2	720	350	87.8	39.4	35.5
163	VGA	720	350	70.2	31.5	28.4
167	VGA	720	350	84.9	37.8	35.4
31	Custom 2	720	400	49.9	20.6	18.5
46	NEC 27 kHz	720	400	55.0	27.0	24.3
73	XGA2	720	400	87.8	39.4	35.5
165	VGA	720	400	70.2	31.5	28.4
169	VGA	720	400	85.0	37.9	35.5
41	VDU 2000 Coros	720	405	59.1	25.4	24.5
43	Teleperm/DS 078	720	408	60.0	25.7	23.1
66	NTSC Progressive	720	480	60.0	31.5	27.0
71	XGA2	720	480	74.9	39.3	35.4
62	PC–Textmode	738	414	70.2	31.5	28.4
21	MTBI	746	246	59.9	15.7	14.1
68	GTF	768	576	60.0	35.8	34.9

Table 1-1 (Continued). Supported video modes for DVI, VGA, EGA, and RGB.

Index	Description	Hres	Vres	V-Freq	H-Freq	Dot Clk
88	GTF	768	576	71.9	43.2	42.9
91	GTF	768	576	74.9	45.1	45.5
104	GTF	768	576	85.0	51.4	51.8
89	NEC 44 kHz	770	549	72.2	44.0	44.0
58	CP 527/60	800	468	60.0	30.9	32.8
76	VG900601	800	600	56.2	35.1	35.9
84	VG900602	800	600	60.2	37.8	39.9
92	VESA 600	800	600	74.9	46.8	49.4
96	VS900603	800	600	72.1	48.0	49.9
106	VESA Standard	800	600	84.9	53.6	56.2
100	MAC Mode	832	624	75.0	49.5	55.4
101	MAC Mode	832	624	74.5	49.7	57.3
80	VESA Standard	960	600	60.1	37.4	46.0
77	768i	1024	384	43.0	35.5	44.9
78	768p	1024	768	86.8	35.5	44.9
98	VG901101	1024	768	59.9	48.3	64.9
99	MAC Mode	1024	768	59.9	48.7	63.9
112	VS910801	1024	768	70.0	56.4	74.9
113	IBM	1024	768	72.1	57.5	75.0
114	SUN Mode	1024	768	72.0	58.0	75.2
116	VESA Standard	1024	768	75.0	60.0	78.7
117	VESA Standard	1024	768	74.9	60.2	79.9
133	VESA Standard	1024	768	64.0	68.6	94.4
108	Custom Corus Group	1024	864	60.0	54.3	73.0
69	VESA Standard	1088	612	60.3	38.2	53.2
13	DISET oversample	1120	288	50.0	15.6	24.5
107	VESA Standard	1152	864	60.0	53.7	81.6

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Table 1-1 (Continued). Supported video modes for DVI, VGA, EGA, and RGB.

Index	Description	Hres	Vres	V-Freq	H-Freq	Dot Clk
121	DMT1185	1152	864	70.0	63.5	100.1
122	VESA Standard	1152	864	70.0	63.8	94.4
130	VESA Standard	1152	864	75.0	67.5	108.0
146	GTF	1152	864	86.1	77.1	119.7
134	Apple Mac II 2	1152	870	75.1	68.7	100.0
118	SUN Mode	1152	900	66.0	61.8	94.4
119	SUN Mode	1152	900	66.7	62.5	95.5
137	NOKIA 447X	1152	900	76.0	71.7	105.5
14	GBE3977 Oversample	1164	288	50.0	15.6	26.0
50	1280i	1280	512	25.0	28.0	44.6
82	VESA CVT 16:9	1280	720	50.0	37.5	74.3
90	VESA CVT 16:9	1280	720	59.9	44.8	74.5
94	TV Mode	1280	768	60.0	47.7	80.1
97	TV Mode	1280	768	60.0	48.1	81.2
102	Beamer 16:10	1280	800	59.8	49.7	83.5
115	VESA Standard	1280	960	60.0	60.0	108.0
139	GTF	1280	960	72.0	72.1	124.6
143	DMT 127A	1280	960	75.0	75.0	126.0
148	GTF	1280	960	77.3	77.5	133.9
156	VESA Standard	1280	960	85.0	85.9	148.4
105	TV Mode	1280	1024	50.1	53.4	90.1
120	SONY GDM2036s	1280	1024	59.9	63.3	108.1
124	VESA Standard	1280	1024	59.9	63.9	107.9
125	Siemens SMI-5	1280	1024	60.0	64.0	112.6
135	VESA Standard	1280	1024	67.0	70.7	119.9
138	SUN Mode	1280	1024	66.7	71.7	117.0
147	SXGA Unix	1280	1024	73.0	77.2	130.9

Table 1-1 (Continued). Supported video modes for DVI, VGA, EGA, and RGB.

Index	Description	Hres	Vres	V-Freq	H-Freq	Dot Clk
149	HP Workstation B123L	1280	1024	72.0	78.1	135.0
151	VESA Standard	1280	1024	75.0	79.9	134.9
158	VESA Standard	1280	1024	85.0	91.1	157.4
93	TV Mode 16:9	1360	765	60.1	47.6	84.5
95	Plasma TV 16:9	1360	768	60.0	47.7	85.5
127	NVIDIA 4:3	1400	1050	59.7	65.0	121.2
150	GTF	1400	1050	72.0	78.8	149.4
153	GTF	1400	1050	75.0	82.2	155.9
26	NTSC	1440	240	30.0	15.8	27.1
109	TV Mode 16:10	1440	900	60.0	55.6	89.0
103	1200i	1600	600	40.0	50.0	108.0
110	TV Mode 16:9	1600	900	59.9	56.8	118.7
123	VESA Standard	1600	1024	60.2	63.8	136.8
142	VESA Standard	1600	1200	60.0	75.0	162.0
144	UXGA	1600	1200	50.1	75.0	138.0
145	UXGA rb	1600	1200	60.3	75.4	140.5
152	VESA Standard	1600	1200	65.0	81.3	175.6
157	VESA Standard	1600	1200	70.0	87.5	189.0
159	VESA Standard	1600	1200	75.0	93.2	164.0
160	VESA Standard	1600	1200	75.0	93.8	202.6
126	WSXGA+ 16:10	1680	1050	59.9	64.7	119.0
128	WSXGA+	1680	1050	60.1	66.4	146.5
154	WSXGA+	1680	1050	74.9	82.3	187.0
161	WSXGA+	1680	1050	85.0	93.9	214.8
155	VESA Standard	1792	1344	60.0	83.6	204.7
51	1080i	1920	540	25.0	28.1	74.2
67	1080@60 Hz	1920	540	30.0	33.8	74.4

Chapter 1: Specifications

Table 1-1 (Continued). Supported video modes for DVI, VGA, EGA, and RGB.

Index	Description	Hres	Vres	V-Freq	H-Freq	Dot Clk
111	1080p	1920	1080	49.7	55.9	147.6
129	1080p	1920	1080	59.7	66.8	172.1
131	1080p	1920	1080	60.0	67.5	148.5
140	WUXGA	1920	1200	59.9	74.0	153.9
141	WUXGA	1920	1200	59.6	74.2	192.3
132	2048*1080@ 60 Hz	2048	1080	60.0	67.5	148.5
136	2048*1151@ 60 Hz	2048	1152	59.9	71.0	156.8

Table 1-2. Supported video modes for Component/Composite Video, S-Video, and SDI.

Description	FBAS	S-Video	Component	(HD)-SDI
480i/60 Hz	X	X	X	X
576i/50 Hz	X	X	X	X
480p/60 Hz	—	—	X	—
576p/60 Hz	—	—	X	—
720p/50 Hz	—	—	X	X
1080p	—	—	—	—

1.3 Connector Pinouts

1.3.1 DVI-D Single-Link Connector

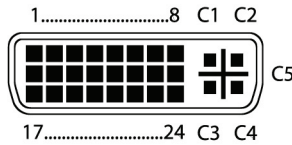


Figure 1-1.

Table 1-3. DVI-D Single-Link Connector pinouts.

Pin	Signal	Pin	Signal	Pin	Signal
1	T.M.D.S. data 2-	9	T.M.D.S. data 1-	17	T.M.D.S. data 0-
2	T.M.D.S. data 2+	10	T.M.D.S. data 1+	18	T.M.D.S. data 0+
3	T.M.D.S. data 2 GND	11	T.M.D.S. data 1 GND	19	T.M.D.S. data 0 GND
4	Not connected	12	Not connected	20	Not connected
5	Not connected	13	Not connected	21	Not connected
6	DDC Input (SCL)	14	+5 VDC high impedance	22	T.M.D.S. clock GND
7	DDC Output (SDA)	15	GND	23	T.M.D.S. clock +
8	Internal use	16	Hot plug recognition	24	T.M.D.S. clock -
C1	Internal use			C3	Internal use
C2	Not connected	C5	GND	C4	Internal use

1.3.2 DVI-I Single-Link Connector

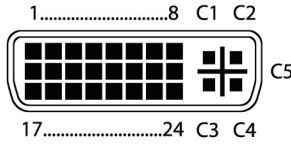


Figure 1-2.

Table 1-4. DVI-I Single-Link Connector pinouts.

Pin	Signal	Pin	Signal	Pin	Signal
1	T.M.D.S. data 2-	9	T.M.D.S. data 1-	17	T.M.D.S. data 0-
2	T.M.D.S. data 2+	10	T.M.D.S. data 1+	18	T.M.D.S. data 0+
3	T.M.D.S. data 2 GND	11	T.M.D.S. data 1 GND	19	T.M.D.S. data 0 GND
4	Not connected	12	Not connected	20	Not connected
5	Not connected	13	Not connected	21	Not connected
6	DDC Input (SCL)	14	+5 VDC high impedance	22	T.M.D.S. clock GND
7	DDC Ouput (SDA)	15	GND	23	T.M.D.S. clock +
8	Internal use	16	Hot plug recognition	24	T.M.D.S. clock -
C1	Internal use			C3	Internal use
C2	Not connected	C5	GND	C4	Internal use

1.3.3 RCA (Cinch) Connector



Figure 1-3. RCA (Cinch) connector.

Table 1-5. RCA (Cinch) connector pinouts.

Pin	Signal
1	GND
2	Data IN/OUT

1.3.4 BNC (SDI, RGB) Connector



Figure 1-4. BNC connector.

Table 1-6. BNC (SDI, RGB) connector pinouts.

Pin	Signal
1	Data IN
2	GND

1.3.5 Mini-DIN (S-Video) Connector



Figure 1-5. Mini-DIN (S-Video) connector.

Table 1-7. Mini-DIN (S-Video) connector pinouts.

Pin	Signal
1	GND (Y)
2	GND (C)
3	Luminance (Y)
4	Chrominance (C)

1.3.6 DB9 (EGA) Connector

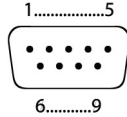


Figure 1-6. DB9 connector.

Table 1-8. DB9 (EGA) connector pinouts.

Pin	EGA	CGA	MDA
1	GND	GND	GND
2	Red (LSB)	—	—
3	Red (MSB)	Red	—
4	Green (MSB)	Green	—
5	Blue (MSB)	Blue	—
6	Green (LSB)	Intensity	Intensity
7	Blue (LSB)	—	Video
8	H-SYNC	H-SYNC	H-SYNC
9	V-SYNC	V-SYNC	V-YNC

1.3.7 Power Supply Connector

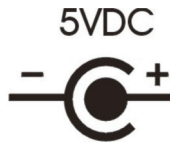


Figure 1-7.

Table 1-9. Power Supply connector pinouts.

Pin	Signal
Inside	VCC (+5 VDC)
Outside	GND

Chapter 1: Specifications

2. Overview

2.1 Introduction

The DVI Converter is used to convert and output video signals of one or more video sources (computer, CPU, camera, DVD player) in the DVI-D format. Models are available to convert DVI-D single-link, DVI-I single-link, S-Video (Y/C), SDI Video, EGA (DB9), Composite Video (BAS/FBAS), Component Video (YPbPr), RGB Video.

The DVI Converter can be used as a switch between concurrently available input signals.

The DVI Converter can be used as a scaler, scaling video signals to a specific output format.

The input ports of the DVI Converter connect to the video source(s) (for example, computer, CPU, camera, DVD player, SPS control), using the provided cables or other suitable video cables.

The DVI-D monitor connects to the output.

Figure 2-1 shows the system overview. Table 2-1 describes its components.

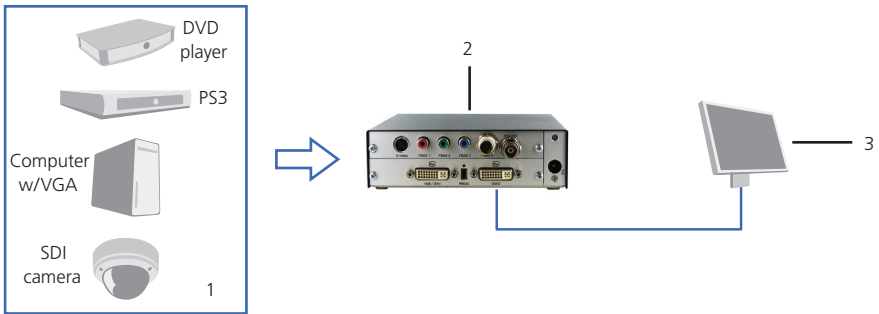


Figure 2-1. System overview.

Table 2-1. System components.

Number	Description
1	Sources (DVD player, computer, camera, SPS control)
2	Media/DVI Converter
3	DVI-D Monitor

NOTE: See Section 3.2 for installation examples.

2.2 Available Products

Table 2-2. Available models.

Product Code	Description
ACS411A-R2	VGA/DVI to DVI-D Converter
ACS412A	VGA/DVI/Video/EGA/CGA to DVI-D Converter
ACS413A	VGA/DVI/Video/SDI to DVI-D Converter
ACS414A	VGA/DVI/RGB to DVI-D Converter

NOTE: The input side of the following KVM extenders correspond to the DVI converter: ACS411A-R2, ACX1T-11V-xx, ACX1MT-DVIHID-xx.

2.3 Upgrade Kits

Table 2-3. Upgrade kits.

Product Code	Description
ACS1009A-RMK	19" 1U rackmount kit used to mount up to four ACS411A-R2 devices
ACS2209A-RMK	19" 1U rackmount kit used to mount up to four ACS412A, ACS413A, or ACS414A devices
ACS4001A-DRM	Mounting plate used to mount by screws/snap on for ACS411A-R2
DRMBACU-S	Mounting option to mount on DIN rail (vertical mount)

2.4 What's Included

Your package should contain the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

ACS411A-R2:

- Media DVI/Converter device
- 5-VDC international power supply unit
- Country specific power cord
- Quick Setup

Chapter 2: Overview

- VGA cable (1.8-m, VGA connector to DVI-I connector)



Figure 2-2. VGA cable.

- Infrared remote control

ACS412A contains everything listed under ACS411A-R2, plus the following items:

- EGA cable (6-ft. [1.8 -m], [1] DB9 connector)



Figure 2-3. EGA cable.

- Component video cable (1.5-m, [3] RCA connectors)



Figure 2-4. Component video cable.

- S-Video (9.6-ft. [3- m], [1] 4-pole mini-DIN connector)



Figure 2-5. S-Video cable.

ACS413A contains everything listed under ACS411A-R2, plus the following items:

- SDI cable (6.4-ft. [2-m], BNC connector)



Figure 2-6. SDI cable.

- Component video cable (5-ft. [1.5-m], [3] RCA connectors)



Figure 2-7. Component video cable.

- S-Video (9.6-ft. [3.0-m], [1] 4-pole mini-DIN connector)



Figure 2-8. S-Video cable.

ACS414A contains everything listed under ACS411A-R2, plus the following items:

- RGB cable (6.4-ft. [2-m], [5] BNC connectors)

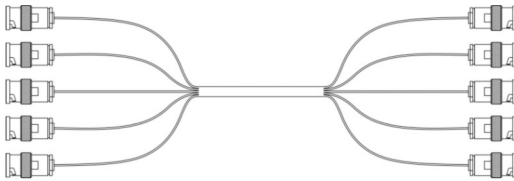


Figure 2-9. RGB cable.

2.5 Hardware Description

2.5.1 ACS411A-R2

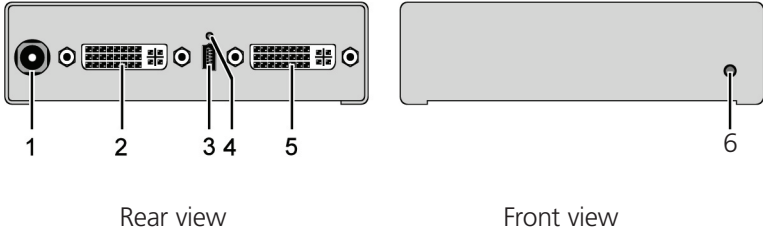


Figure 2-10. Front and back views of the ACS411A-R2.

Table 2-4. ACS411A-R2 components.

Number	Component
1	Connect to 5-VDC power supply
2	Input: DVI-I (VGA)
3	Service port
4	IR receiver for remote control
5	Output: DVI-D
6	LED status indicator

2.5.2 ACS412A

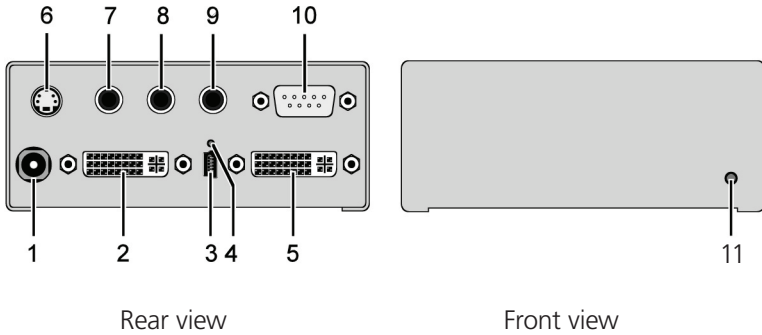


Figure 2-11. Front and back views of the ACS412A.

Table 2-5. ACS412A components.

Number	Component
1	Connect to 5-VDC power supply
2	Input: DVI-I (VGA)
3	Service port
4	IR receiver for remote control
5	Output: DVI-D
6	Input: S-Video (Y/C)
7	Input: FBAS 1 or YPbPr (Pr)
8	Input: FBAS 2 or YPbPr (Y)
9	Input: FBAS 3 or YPnPr (Pb)
10	Input: EGA
11	LED status indicator

2.5.3 ACS413A

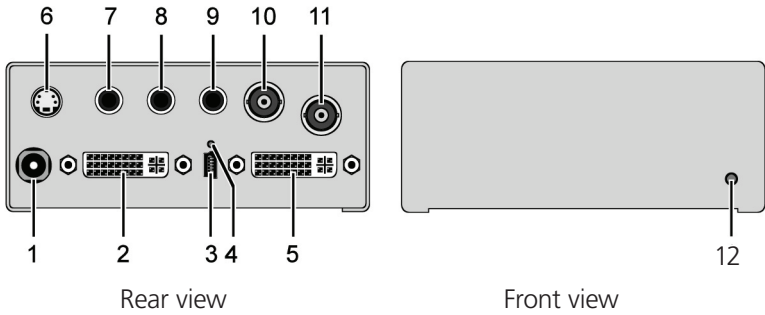


Figure 2-12. Front and back views of the ACS413A.

Table 2-6. ACS413A components.

Number	Component
1	Connect to 5-VDC power supply
2	Input: DVI-I (VGA)
3	Service port
4	IR receiver for remote control
5	Output: DVI-D
6	Input: S-Video (Y/C)
7	Input: FBAS 1 or YPbPr (Pr)
8	Input: FBAS 2 or YPbPr (Y)
9	Input: FBAS 3 or YPbPr (Pb)
10	Input: FBAS 4
11	Input: (HD-) SDI
12	LED status indicator

2.5.4 ACS414A

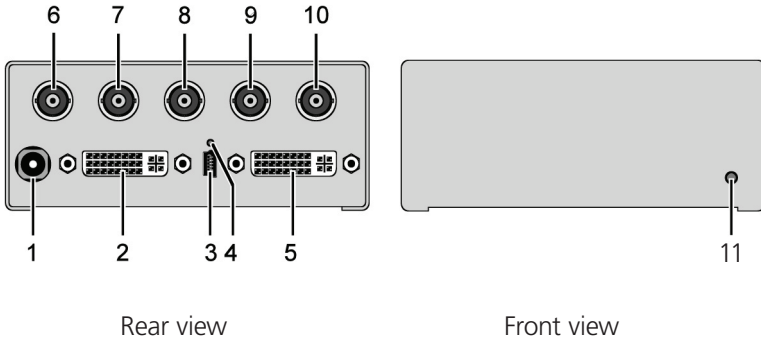


Figure 2-13. Front and back views of the ACS414A.

Table 2-7. ACS414A components.

Number	Component
1	Connect to 5-VDC power supply
2	Input: DVI-I (VGA)
3	Service port
4	IR receiver for remote control
5	Output: DVI-D
6	Input: RGB (red)
7	Input: RGB (green)
8	Input: RGB (blue)
9	Input: (H-/Compos. Sync)
10	Input: (V-Sync)
11	LED status indicator

2.6 Status LEDs

The Media Converter has a multi-color LED that indicates the connection status.

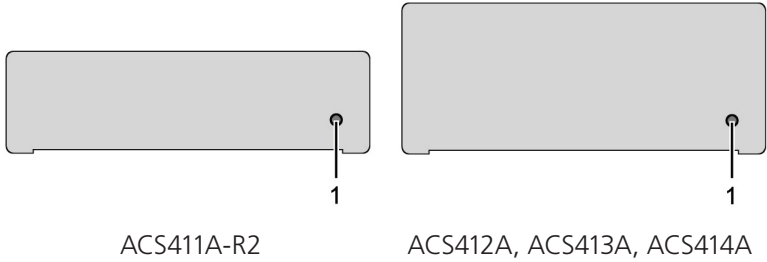


Figure 2-14. Front views showing LEDs on the ACS411A-R2 and ACS412A–ACS414A.

Table 2-8. LED 1: Connection and video status.

LED Color	Description for the Input	Description for the Output
Red	No input signal	Monitor detected
Dark Red	Resolution not supported	Monitor not detected
Green	Active video signal	Monitor not detected
Blue	No input signal	Monitor detected
Violet	Resolution not supported	Monitor detected
Turquoise	Active video signal	Monitor detected

3. Installation

3.1 System Setup

NOTE: If you are a first-time user, we recommend that you set up the system with the CPU unit and the CON unit in the same room as a test setup. This will enable you to identify and solve any cabling problems, and experiment with your system more conveniently.

NOTE: Verify that interconnect cables, interfaces, and handling of the devices comply with the requirements (see Chapter 1, Specifications).

1. Switch off all devices.
2. Connect the monitor to the Media/DVI Converter.
3. Connect the source (for example, computer, video camera, or control unit) to the media converter with the included cables. Make sure that the cables are not strained.
4. Connect the included 5-VDC power supply to the media converter.
5. Power up the system.

NOTE: Power up the system devices in this order: monitor, media/DVI converter, source.

3.2 Example Applications

Figures 3-1 and 3-2 show typical applications of the Media Converter. Tables 3-1 and 3-2 describe their components.



Figure 3-1. Example application #1, video input: Composite.

Table 3-1. Example application 1 description (Composite video).

Number	Component
1	Source (observation camera)
2	Media-/DVI-Converter
3	Monitor

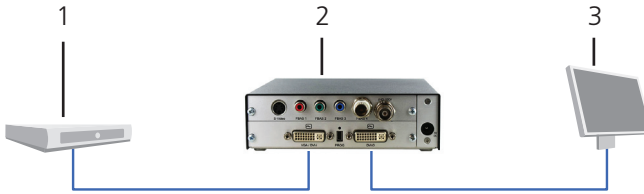


Figure 3-2. Example application 2, video input: S-Video.

Table 3-2. Example application 2 description (S-Video).

Number	Component
1	Source (DVD player)
2	Media-/DVI-Converter
3	Monitor

4. Configuration

4.1 Infrared Remote Control

You can convert the Media-/DVI-Converter via an on-screen display (OSD) and via an infrared remote control. Navigate through the OSD menu items.

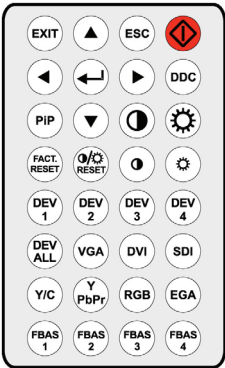



Figure 4-1. Infrared remote control.

NOTE: In the OSD, only the navigation keys of the infrared remote control function. Navigation keys include: red function key, <↵> key, <EXIT> key, <ESC> key, and cursor keys: <←>, <→>, <↑>, <↓>.

Table 4-1. Infrared (IR) remote control key functions.

Button	Description
	Open OSD or select menu.
	Open OSD or select menu
	Leave OSD.

Chapter 4: Configuration

Table 4-1 (Continued). Infrared (IR) remote control key functions.





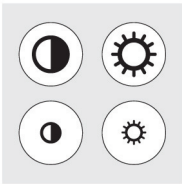









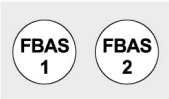
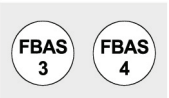
Button	Description
	Leave current menu and open upper menu level.
 	Navigate inside the OSD. Select parameters with cursor keys ◀ and ▶.
	Read and use DDC of the connected monitor.
	Adjust picture contrast/brightness.
	Reset the Media/DVI Converter to factory default.
	Reset picture contrast/brightness to factory default.

Table 4-1 (Continued). Infrared (IR) remote control key functions.

Button	Description
 	If more than one converter is used, select a single device for OSD access.
	If more than one converter is used, select all devices for OSD access.
 	Select input signal: VGA, DVI, or SDI.
 	Select input signal: <ul style="list-style-type: none">• Y/C (S-Video)• YPbPr (Component Video)• RGB• EGA

Chapter 4: Configuration

Table 4-1 (Continued). Infrared (IR) remote control key functions.

Button	Description
 	Select input signal FBAS 1–3 (Cinch) or FBAS 4 (BNC).

4.2 On-Screen Display (OSD)

You can adjust all settings of the Media-/DVI-Converter via the on-screen display (OSD).



Figure 4-2. General Structure of the OSD.

The left column shows the range of the main menu, the right column shows the current submenus with the respective configuration options.

The various configuration and setting options of the Media-/DVI-Converter are described in Sections 4.2.1–4.2.5.

4.2.1 Main Menu Item “Color Settings”

This menu offers color-specific settings and configurations for the Media-/DVI-Converter.

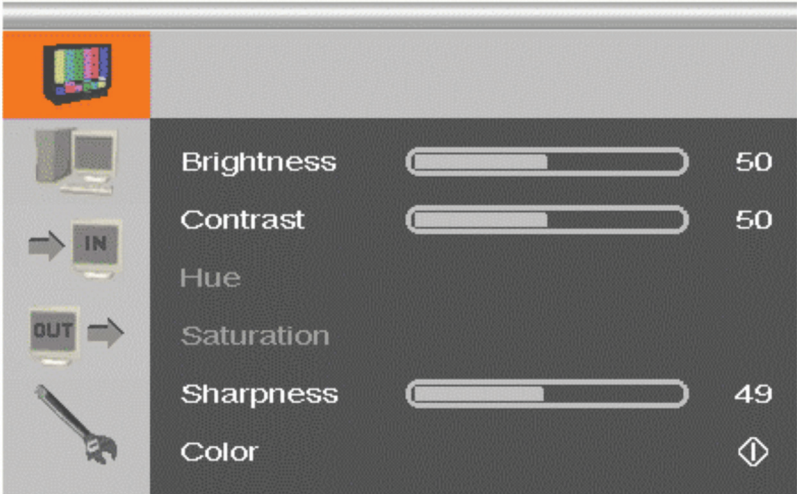


Figure 4-3. Color Settings screen.

Table 4-2. Color Settings screen functions.

Menu Item	Description
Brightness	Adjust brightness of the picture.
Contrast	Adjust contrast of the picture.
Hue	Change and adjust hue of the picture (only selectable in case of video input signals).
Saturation	Adjust saturation of the picture (only selectable in case of video input signals).
Sharpness	Adjust sharpness of the picture.
Color	Open submenu “Color.”

Submenu “Color”

This submenu offers advanced color settings for the picture (VGA/RGB/EGA input only).

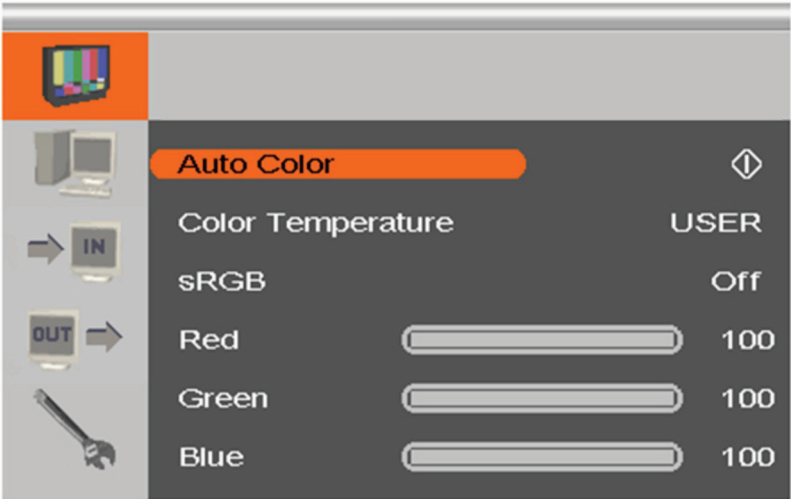


Figure 4-4. Color Settings submenu screen.

Table 4-3. Color Settings submenu screen functions.

Menu Item	Description
Auto Color	Adjust color values automatically.
Color Temperature	Adjust color temperature of the picture.
RGB	Activate the use of the standard RGB color range (color optimization for tube monitors).
Red	Adjust red color range.
Green	Adjust green color range.
Blue	Adjust blue color range.

4.2.2 Main Menu Item “Picture Settings”

This menu offers specific picture settings at the Media-/DVI-Converter.

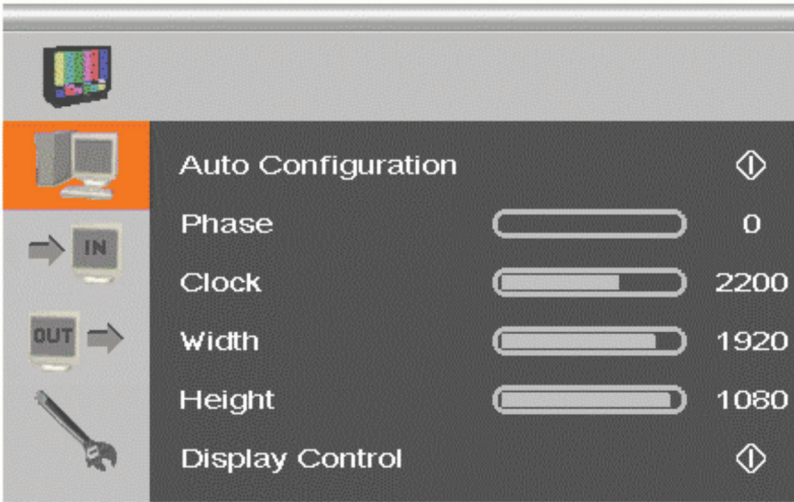
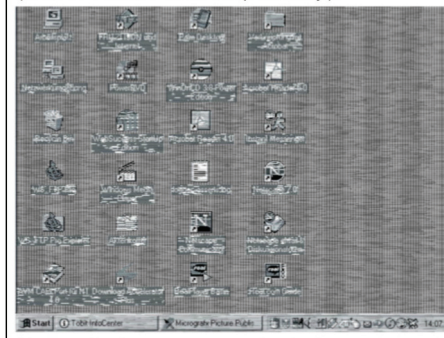


Figure 4-5. Picture Settings screen.

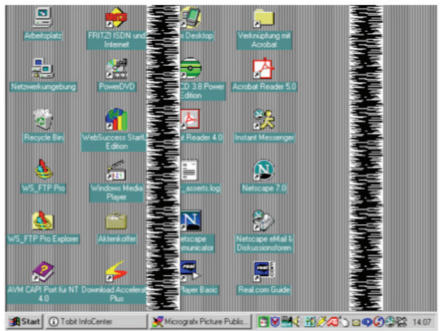
Table 4-4. Picture Settings screen functions.

Menu Item	Description
Auto Configuration	Configure picture settings automatically (VGA/RGB/EGA input only).
Phase	Adjust pixel phase (that is, the best position for the analog/digital/ conversion within one pixel [VGA/RGB/EGA input only]).



Example of a wrong pixel phase.

Table 4-4 (Continued). Picture settings screen functions.

Menu Item	Description
<p>Clock</p>	<p>Adjust pixel clock. The pixel clock shows the maximum number of the pixels that are can be displayed horizontally. Even non-visible and inactive pixels are included (VGA/RGB/EGA input only).</p>  <p>Example of a wrong pixel clock.</p>
<p>Width</p>	<p>Adjust width of the picture with the number of pixels.</p>
<p>Height</p>	<p>Adjust height of the picture with the number of pixels.</p>
<p>Display Control</p>	<p>Open "Display Control" submenu (see the next page).</p>

“Display Control” Submenu

This submenu offers control options for the display of the picture.

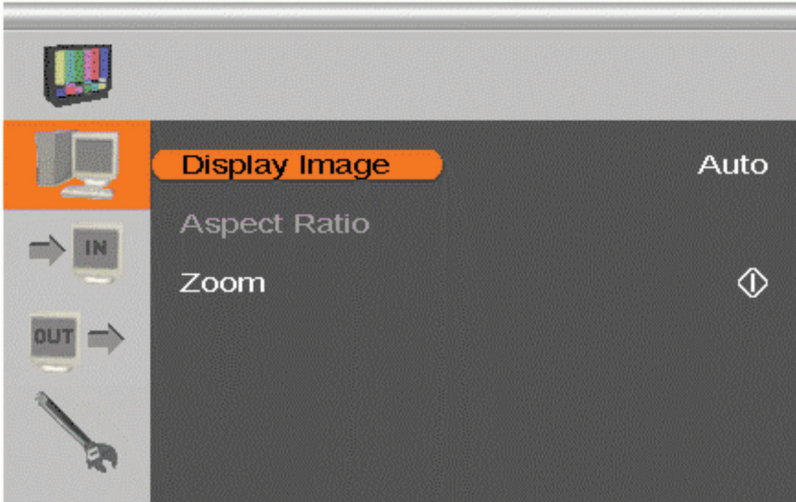


Figure 4-6. Display Control submenu.

Table 4-5. Display Control submenu screen functions.

Menu Item	Description
Display Image	Select display option: <ul style="list-style-type: none">• Auto: Scale picture automatically to the maximum value.• Aspect: Adjust aspect ratio manually.• 1:1: Show picture in original size with a black border.
Aspect Ratio	Select aspect ratio: Auto: 4:3, 14:9, 16:9, or >16.9 (only if Display Image is set to “Aspect Ratio.”)
Zoom	Zoom picture and determine position of enlargement.

4.2.3 Main Menu Item “Input Settings”

This menu offers specific settings for the input of the Media-/DVI-Converter.

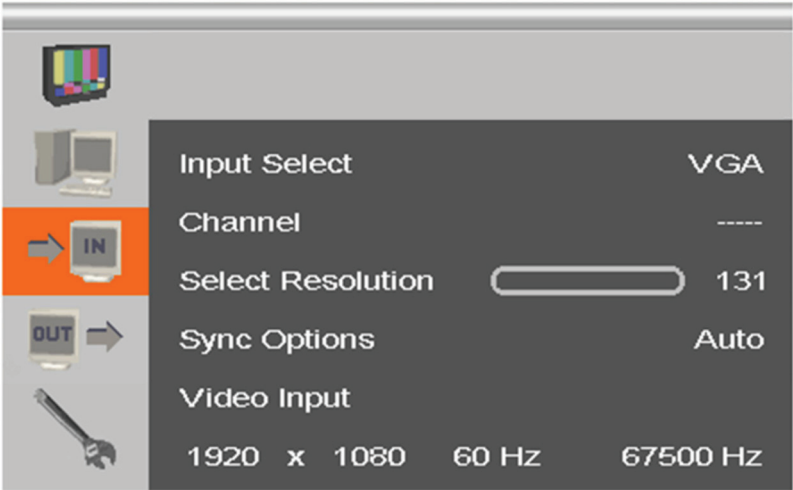


Figure 4-7. Input Settings screen.

Table 4-6. Input Settings screen functions.

Menu Item	Description
Input Select	Select input signal
Channel	<ul style="list-style-type: none"> • For FBAS input signal: Select Composite channel. • For EGA input: Select EGA, CGA, or MDA input signal.
Select Resolution	<p>Select video mode compatible to input signal (see Chapter 1, Table 1-1 for supported video modes).</p> <p>Save settings by leaving the menu (monitor goes blank for a short time).</p>
Sync Options	<p>Select type of synchronization of the RGB signal. The type depends on the incoming RGB signal.</p> <ul style="list-style-type: none"> • Auto: automatic adjustment • Composite (CS) or Sync On Green (SOG): Manual adjustment in case of picture failures (VGA/RGB input only).
Video Input	Display of selected video mode.

4.2.4 Main Menu Item "Output Settings"

This menu offers specific settings for the output of the Media-/DVI-Converter.

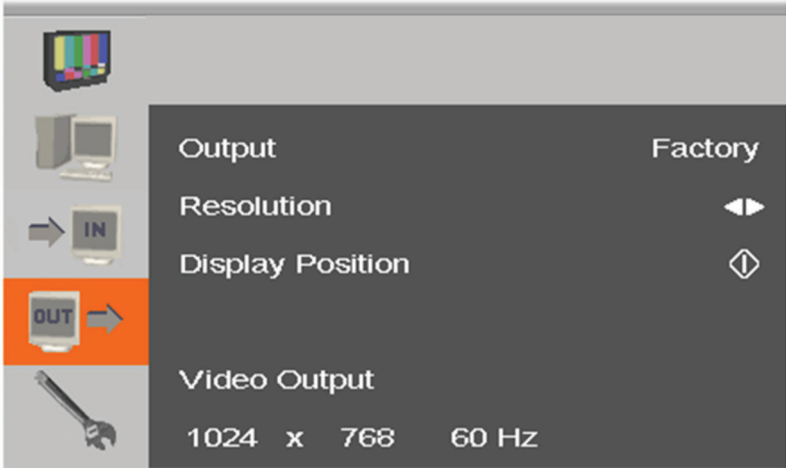


Figure 4-8. Output Settings screen.

Table 4-7. Output Settings screen functions.

Menu Item	Description
Output	Select output resolution: <ul style="list-style-type: none">• DDC: Use preferred resolution of the monitor's DDC at the output.• Select: Select from predefined output. * 1:1: Use input resolution as output resolution.
Resolution	If Output is set to "Select": Select from predefined output resolutions. A higher resolution can be selected at any time. If you select a lower resolution, the number of output pixels needs to comply with the following rule: <ul style="list-style-type: none">• Horizontally: At least 50%.• Vertically: At least 33%.
Display Position	Adjust position of picture manually.
Video Output	Display of the selected output resolution.

NOTE: For the scaling of the 1920 x 1200 resolution, restrictions apply.

4.2.5 Main Menu Item “General Settings”

This menu offers general settings for the media converter.

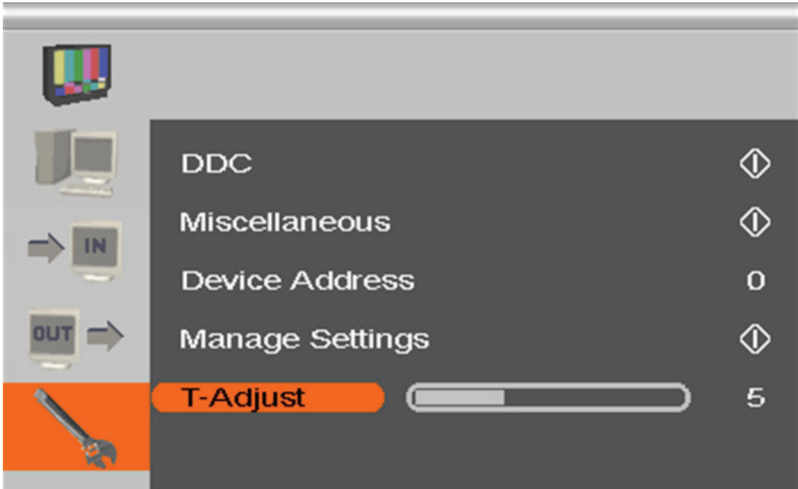


Figure 4-9. General Settings screen.

Table 4-8. General Settings screen functions.

Menu Item	Description
DDC	Open DDC submenu (see the next page).
Miscellaneous	Open Miscellaneous submenu (see the Miscellaneous submenu. It’s described after the DDC submenu in this manual).
Device Address	Assign device ID. The device ID clearly identifies the device for the infrared remote control so that settings can be made for a specific device only.
Manage Settings	Write the existing device settings on the internal memory of the media converter (Save). These settings can be loaded again if required (Load), for example, after a firmware upgrade.
T-Adjust	Compensate picture failures due to device temperature.

NOTE: Save the device settings if you have made extensive settings or if you want to upgrade the firmware.

DDC Submenu

This submenu offers DDC specific settings. DDC information is relevant for the output settings and for the connection to a computer or CPU.

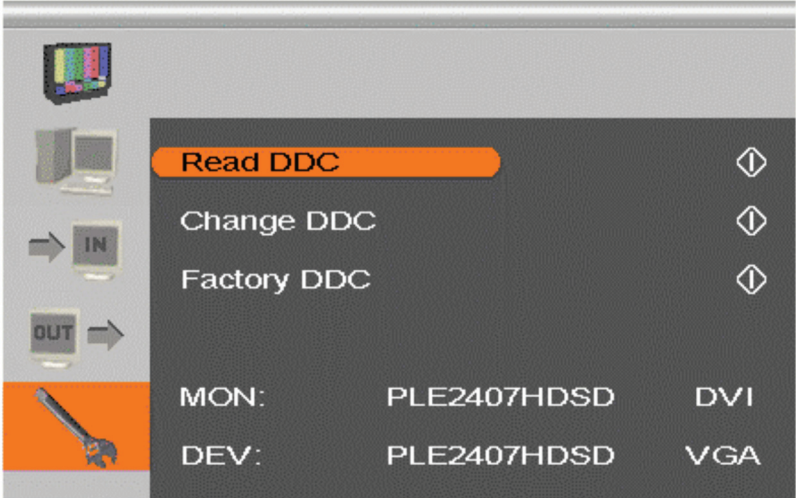


Figure 4-10. DDC submenu.

Table 4-9. DDC submenu options.

Menu Item	Description
Read DDC	Use the monitor DDC as the device DDC and save it as DVI or VGA DDC.
Change DDC	Save the device DDC as DVI or VGA DDC.
Factory DDC	Use the default DDC “VGA2DVI” as the device DDC.
MON:	Display name and type of the monitor DDC.
DEV:	Display name and type of the device’s DDC that is provided at the DVI-I input by the media converter.

NOTE: When saving the DDC as DVI or VGA DDC, the selected type of the DDC must match the video signal of the source (VGA or DVI), see the “Input Select” option in Figure 4-7 and Table 4-6.

Miscellaneous Submenu

This submenu offers various device specific settings.

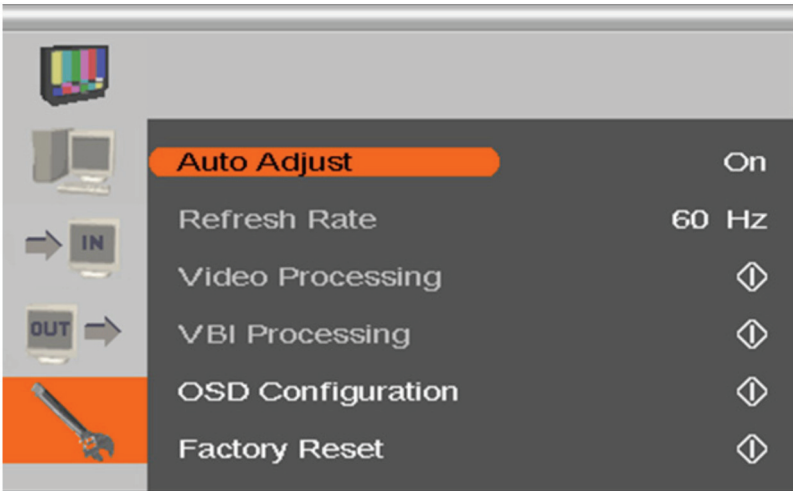


Figure 4-11. Miscellaneous submenu screen.

Table 4-10. Miscellaneous submenu options.

Menu Item	Description
Auto Adjust	Activate or deactivate the automatic configuration of the picture settings after changing the video mode.
Refresh Rate	Change refresh rate if the output is set to DDC.
Video Processing	Not used
VBI Processing	Not used
OSD Configuration	Configure OSD display on the screen.
Factory Reset	Reset device to factory default (confirmation dialog).

OSD Configuration Submenu

This submenu offers various settings for the OSD display.

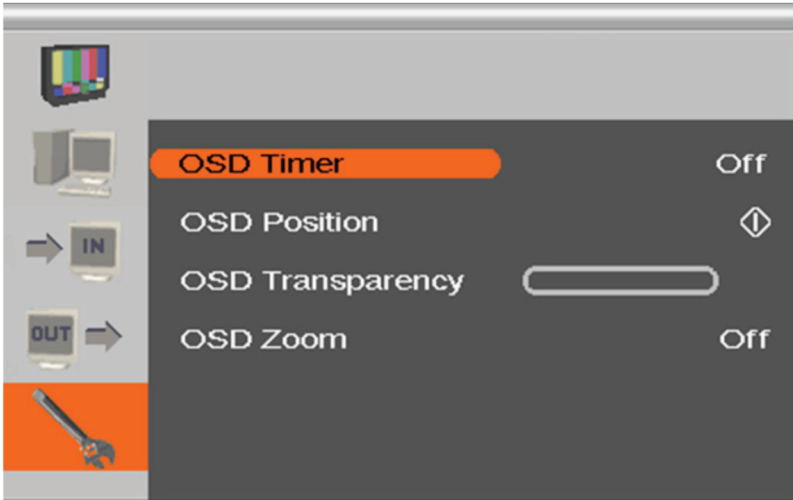


Figure 4-12. OSD Configuration menu.

Table 4-11. OSD Configuration submenu options.

Menu Item	Description
OSD Timer	Activate and select the time of inactivity after which OSD is closed automatically.
OSD Position	Adjust vertical and horizontal OSD position on screen.
OSD Transparency	Adjust OSD transparency.
OSD Zoom	Activate scaling of OSD display.

5. Operation

5.1 Optimization of Picture Settings

All common video modes are pre-installed in an internal table of the media converter. If the input signal corresponds to one of these video modes, the signal will be automatically detected and the picture will be displayed.

If picture quality is not satisfying or no picture is displayed, proceed as follows:

1. Optimize the output settings (see Section 5.1.1). The picture display will be adapted to the properties of the monitor.
2. Optimize the input settings (see Section 5.1.2). Check if the automatically detected video mode corresponds to your input signal. Or, you can manually select the most suitable video mode, even if you have an unknown input signal.
3. Optimize the picture settings for your input signal (see Section 5.1.3).

NOTE: If you have problems optimizing picture settings, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

5.1.1 Optimization of Output Settings

1. If you have an analog input signal, display a picture with as much detail as possible on your graphic source, for example, a text with black letters on a white ground (or vice versa).
2. Open the OSD with the infrared remote control.
3. Select "Output Settings" in the main menu (see Section 4.2.4).
4. Select the output resolution in the menu item "Output":
 - Select "DDC" to use the preferred resolution of the DDC monitor.
 - If the preferred resolution of the device DDC does not result in a satisfying picture, select "Factory." Then select the most suitable resolution for the monitor from the menu item "Resolution."
5. Exit the OSD. A window appears to save settings. This may take a few seconds.
6. Save the settings.

5.1.2 Optimization of Input Settings

For certain analog input signals (VGA / RGB / EGA), if the picture quality is not satisfying or no picture is displayed, you can select a video mode depending on the input signal.

1. Open the OSD with the infrared remote control.
2. Select “Input Settings” in the main menu (see Section 4.2.3).
3. Test the recommended resolutions that are listed in the menu item “Select Resolution.” The menu item is inactive if there is only one recommended resolution.
4. Run the automatic picture adjustment:
 - Select “Picture Settings” in the main menu (see Section 4.2.2).
 - Select the menu item “Auto Configuration.” The picture size might change.
5. Check the test picture: If the vertical lines are displayed clearly, without smear or tremble, the setting is successful.
6. Exit the OSD. A window appears to save settings. This can take a few seconds.
7. Save the settings.

5.1.3 Optimization of Picture Settings

For certain analog input signals (VGA /RGB /EGA), if the picture quality is still not satisfying after the automatic picture adjustment, you can adjust clock and phase manually.

1. Select “Picture Settings” in the main menu.
2. Modify the values in the menu items “Clock” and “Phase” until all failures have disappeared.
3. If the picture is displaced:
 - Select the menu item “Display Position” in the main menu item “Output Settings” and position the picture in the upper left corner of the monitor.
 - Select the menu items “Width” and “Height” in the main menu item “Picture Settings” and modify the values for width and height of the picture until the monitor is completely filled by the picture.
4. Exit the OSD. A window appears to save settings. This can take a few seconds.
5. Save the settings.

5.2 Download of DDC Information

Loading DDC information is only relevant if you want to connect a DVI or VGA source. By default, the factory DDC information is reported to the source (computer, CPU). If these settings do not lead to a satisfying result, the DDC information of the connected monitor can be downloaded and stored internally.

There are two options to load the DDC information of the connected monitor:

- Using the infrared remote control (see Section 5.2.1).
- Using the “Read DDC” command in the OSD (see Section 5.2.2).

5.2.1 Download DDC Using Infrared Remote Control

1. Press the <DDC> button on your infrared remote control.
2. Save the DDC as DVI or VGA DDC matching the input video signal.

The DDC information of the connected monitor is saved in the media converter in the selected format.

The source (computer, CPU) can read the DDC information of the monitor and display the available video resolutions.

5.2.2 Download DDC Using OSD

1. Open the OSD with the infrared remote control.
2. Select “General Settings” in the main menu (see Section 4.2.5).
3. Select the menu item “Read DDC” in the submenu “DDC.”
4. Save the DDC as DVI or VGA DDC matching the input video signal.

The DDC information of the connected monitor is saved in the media converter in the selected format and is displayed at the bottom of the OSD menu under “DEV:”.

The source (computer, CPU) can read the DDC information of the monitor and display the available video resolutions.

Chapter 6: Troubleshooting

6. Troubleshooting

6.1 Blank Screen

Problem: Status LED is blue.

Possible Cause: No video signal detected.

Solution #1: Check connections.

Solution #2: Check input selection in the OSD (source type).

Solution #3: Load DDC information of the connected monitor (see Section 5.2).

Solution #4: Reboot CPU if necessary.

Problem: Status LED is green.

Possible Cause: No monitor is detected.

Solution: Check the connection, length, and quality of the DVI-D cable to monitor; tighten cable thumbscrews.

Problem: Status LED is dark red.

Possible Cause #1: No monitor is detected.

Solution #1: Check the connection, length, and quality of the DVI-D cable to monitor; tighten cable thumbscrews.

Possible Cause #2: Resolution on the device side is not supported.

Solution #2: Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com; we will make a customer specific video mode.

Problem: Status LED is violet.

Possible Cause: Resolution on the device side is not supported.

Solution: Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com; we will make a customer specific video mode.

6.2 Picture

Problem: Incorrect picture display.

Possible Cause #1: Connection is disturbed.

Possible Solution #1: Check the connection, length, and quality of the DVI-D cable to monitor; tighten cable thumbscrews.

Possible Cause #2: Transmission parameters are not suitable or not optimally set for conditions.

Possible Solution #2a: Run Auto Configuration (see Section 4.2.2).

Possible Solution #2b: If necessary, set the parameters for the picture settings manually (for example, phase and clock) (see Section 4.2.2).

Problem: Parts of the picture are missing.

Possible Cause: Wrong setting of picture size.

Possible Solution: Optimize picture settings (see Section 5.1).

Problem: Horizontal picture jitter.

Possible Cause: Wrong settings of phase and clock.

Possible Solution: Readjust phase and clock manually (see Section 4.2.2).

Problem: Characters are smeared.

Possible Cause: Wrong setting of phase.

Possible Solution: Readjust phase manually (see Section 4.2.2).

Problem: Fine vertical lines are missing.

Possible Cause: Wrong setting of clock.

Possible Solution: Readjust clock manually (see Section 4.2.2).

Chapter 6: Troubleshooting

6.3 General

Problem: Infrared remote control is not functioning.

Possible Cause: Wrong device is selected.

Possible Solution: Press the <DEV ALL> button on the infrared remote control to get device-independent access to the functions.

6.4 Contacting Black Box

If you determine that your media converter is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.

6.5 Shipping and Packaging

If you need to transport or ship your media converter:

- Package it carefully. We recommend that you use the original container.
- If you are returning the unit, make sure you include everything you received with it. Before you ship for return or repair, contact Black Box to get a Return Authorization (RA) number.

7. Glossary

CATx — Any CAT5e, CAT6, or CAT7 cable.

CGA — The Color Graphics Adapter (CGA) is an old analog graphic standard with up to 16 displayable colors and a maximum resolution of 640 x 400 pixels.

Component Video — The Component Video (YPbPr) is a high-quality video standard that consists of three independently and separately transmittable video signals: the luminance signal and two color difference signals.

Composite Video — The Composite Video is also called FBAS and is part of the PAL TV standard.

CON Unit — Component of a media/DVI converter or media extender to connect to the console (monitor[s], keyboard, and mouse); optionally also with USB 2.0 devices.

Console — Keyboard, mouse, and monitor.

CPU Unit — Component of a media/DVI converter or media extender to connect to a source (computer, CPU).

DDC — The Display Data Channel (DDC) is a serial communication interface between a monitor and a source (computer, CPU). It enables data exchange via monitor cable and an automatic installation and configuration of a monitor driver by the operating system.

Dual Access — A system to operate a source (computer, CPU) from two consoles.

Dual-Head — A system with two video connections.

Dual-Link — A DVI-D interface for resolutions up to 2560 x 2048 by signal transmission of up to 330 MPixels/s (240-bit).

DVI — Digital video standard, introduced by the Digital Display Working Group (<http://www.ddwg.org>). Single-link and dual-link standard are distinguished. The signals have TMDS level.

DVI-I — A combined signal (digital and analog) that allows running a VGA monitor at a DVI-I port—in contrast to DVI-D (see DVI).

Fiber — Single-mode or multimode fiber cables.

EGA — The Enhanced Graphics Adapter (EGA) is an old analog graphics standard introduced by IBM® in 1984. It uses a DB9 connector.

Chapter 7: Glossary

FBAS — The analog color video baseband signal (FBAS) is also called Composite Video and is part of the PAL TV standard.

KVM — Keyboard, video, and mouse.

Mini-XLR — Industrial standard for electrical plug connections (3-pole) for the transmission of digital audio and control signals.

Multimode — 62.5- μ multimode fiber cable or 50- μ multimode fiber cable.

OSD — The On-Screen Display is used to display information or to operate a device.

Quad-Head — A system with four video connections.

RCA (Cinch) — A non-standardized plug connection for transmission of electrical audio and video signals, especially with coaxial cables.

SFP — Small Form Factor Pluggable (SFP) modules are pluggable interface modules for Gigabit connections. SFP modules are available for CATx and fiber interconnect cables.

Single-Head — A system with one video connection.

Single Link — A DVI-D interface for resolutions up to 1920 x 1200 by signal transmission of up to 165 MPixels/s (24-bit). Alternative frequencies are Full HD (1080p), 2K HD (2048 x 1080), and 2048 x 1152.

Single-mode — 9- μ single-mode fiber cable.

S-Video (Y/C) — The S-Video (Y/C) is a video format transmitting luminance and chrominance signals separately. It has a higher-quality standard than FBAS.

TOSLINK — Standardized fiber connection system for digital transmission of audio signals (F05 plug connection).

Triple-Head — A system with three video connections.

USB-HID — USB-HID devices (Human Interface Device) allow for data input. There is no need for a special driver during installation. “New USB-HID device found” is reported. Typical HID devices include keyboards, mice, graphics tablets, and touchscreens. Storage, video, and audio devices are not HID.

VGA — Video Graphics Array (VGA) is a computer graphics standard with a typical resolution of 640 x 480 pixels and up to 262,144 colors. It is preceded by the graphics standards MDA, CGA, and EGA.

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