REVISIONS

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2600	C	REVISED PER ECN	990216	SA		JS
2716	D	REVISED PER ECN	990818	SA		JS
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UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN INCHES. ALL CAPACITANCE VALUES ARE IN MICROFARADS. ALL RESISTANCE VALUES ARE IN OHMS.

ANALOG MODULES, INC.

a HEICO company

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TOLERANCES

DECIMAL
.XX = N/A
.XXX = N/A

TITLE

OPERATING MANUAL
MODEL 5723, 5724

ANGULAR	SCALE	SIZE	FSCM	SHEET	DRAWING NUMBER	REV.
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DCN#: 4905

OPERATING MANUAL
FOR
MODEL 5723, 5724

CAPACITOR CHARGING POWER SUPPLY

Analog Modules, Inc.
126 Baywood Avenue
Longwood, FL 32750

Approval: _____
Timothy Ayres, Product Manager

_____
Jeff Richter, Product Engineer

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MODEL 5723, 5724

SPECIAL PRECAUTIONS

CAUTION

- Read this manual carefully before attempting to install or operate the model 5723, 5724.
- This unit contains no user serviceable parts. Manufacturer's warranty is void if field serviced.
- Proper installation is necessary to limit access to lethal voltages.

MODEL 5723, 5724

Spezielle Vorsichtsmaβregein

Achtung

- Lesen Sie bitte dieses Handbuch genau, bevor Sie das Modell 5723, 5724 anschlieβen oder in Betrieb nehmen.

- Reparaturen dürfen nur von autorisiertem Servicepersonal vorgenommen werden. Bei unbefugtem Öffnen des Gerätes erlischt die Herstellergarantie.

- Achtung: Teile können Hochspannung führen !!
  Eine einwandfrele Installation ist notwendig um das unbeabsichtigte Berühren von tödlichen Hochspannungen unmöglich zu machen.

LABELS

Abbreviations:

A	amperes
AC	alternating current
°C	degrees Celsius
CW	Continuous wave
Hz	hertz
IEC	International Electrotechnical Commission
kHz	kilohertz
kW	kilowatts
kΩ	kiloohms
(L)	line conductor, single phase system
mA	milliamp
mm	millimeter
mV	millivolt
(N)	neutral conductor, single phase system
V	volts
VAC	alternating voltage
VDC	direct voltage
W/°C	watts per degree Celsius
Z	impedance
OEM	original equipment manufacturer
PFN	pulse forming network
W	watts
pk	peak
HV	high voltage
RTN	return
N/C	no connection
f/s	full scale
Ω	ohms

Symbols:

Protective Earth (ground) Terminal

Local signal reference

Alternating Current

Earth (ground)

Direct Current

Dangerous Voltage

SECTION 1

INTRODUCTION

1.0 INTRODUCTION

The 5720 series isolated switch-mode power modules use proprietary power conversion techniques to provide the highest power density of any power module currently on the market. All models are designed to meet the isolation and leakage current requirements for UL544 and IEC 601-1.

All supplies feature open circuit, short circuit, and thermal overload protection, as well as active power factor correction.

The Model 5723 is a capacitor-charging module designed to repeatedly charge energy storage capacitors for pulsed solid-state laser applications.

The Model 5724 is a capacitor charging module designed to charge energy storage capacitors to a specified voltage and to maintain this output level for switched variable pulsewidth solid-state laser applications.

SECTION 2

ENVIRONMENTAL DATA

2.0 ENVIRONMENTAL DATA

2.1 Non-operating (transport and storage)

Ambient Temperature:	-40°C to +70°C
Relative Humidity:	10% to 100%, non-condensing
Atmospheric Pressure:	500hPa to 1060hPa (7.25 to 15.37 psia)

2.2 Environmental Risk

The substances used in the product pose no known health or environmental risk associated with the disposal of the product at the end of their useful lives.

SECTION 3

SET-UP AND INTERFACE

3.0 SET-UP AND INTERFACE

3.1 Mechanical Considerations

Installation begins with mounting the module in a suitable enclosure which complies with the following criteria:

A. Enclosure must provide protection against possible human contact with live parts.

B. Enclosure must be adequately grounded to protective earth to ensure operator safety, or constructed entirely of a non-conductive material. In the latter case, all internal exposed metal parts must be grounded to protective earth.

3.2 Electrical Connections

Electrical connections are made in three groups; the power input, HV output, and control interface groups. These groups are terminated in three different connectors.

3.2.1 Power Input Group

The power-input connector is a Molex 19-09-2038, using Molex 02-09-2103 terminals. The mating connector is a Molex 19-09-1039, using Molex 02-09-1104 terminals.

IEC 601-1 requires that both line and neutral be fused. Therefore, fuses should be installed in series with both the high and low sides of the mains. Recommended values for each version of the supply are listed below:

Two power input options exist:

	Part number suffix	Fuse Rating
115VAC	-C	15A
230VAC	-D	15A

Input power requirements for the modules are typically 2150W for the 5724, and 1850W for the 5723.

3.2.2 HV Output Group

The HV output connector is a MHV coax connector. The mating connector is an Amphenol UG-932/U, using RG-59 coaxial cable. The HV output cable is supplied as an AMI 4961 assembly.

The HV output center conductor should connect to the load capacitor bank. The HV RTN (shield) should connect to the flashlamp common star ground.

Typical output power for the modules is 1750W for the 5724, and 1500W for the 5723. Power output will decline for any charger that is not operated at its full output voltage. Please refer to the output power charts for reduction of output power with reduction of output voltage.

3.2.3 Control Interface Group

The Control Interface connector is a standard 15-pin D-sub connector. The part # is DB-15S.

The reference figures for each signal are schematic representations of the interface, and may be found on the 5723/5724 Interface Circuits pages.

The following standard (-1) connections are available:

PIN	Signal Name	Description
1	TEMPERATURE TEST POINT	Represents charger temperature as a DC voltage through 4.7kΩ of output impedance (reference figure 1). Refer to temperature test point data chart. Shutdown occurs at approximately 72°C.
2	PROGRAM VOLTAGE	0 to 10V control differential input (reference Figure 2).
3	N/C RESERVED	NO CONNECTION.
4	PRIMARY INHIBIT	3.5 to 30V input to inhibit charger. 10kΩ load impedance (reference Figure 3).
5	N/C RESERVED	NO CONNECTION.
6	+5V REFERENCE	5V reference with 100Ω source impedance. 10mA maximum current draw. Overload on this line could interfere with normal charger operation (reference Figure 5).
7	OVERTEMP FAULT INDICATOR	(16V maximum) Open collector output rated to 16V and capable of sinking up to 15mA (reference Figure 6). Fault indicated by low condition.
8	END OF CHARGE INDICATOR	Diode isolated output of 15.5V capable of sourcing up to 15mA. Charge complete indicated by high output signal (reference Figure 4).
9	PROGRAM RETURN	0 to 10V control differential input return (reference Figure 2).
10	SIGNAL RETURN	Used for low current signal output, and input returns.
11	N/C RESERVED	NO CONNECTION.
12	N/C RESERVED	NO CONNECTION.
13	N/C RESERVED	NO CONNECTION.
14	N/C RESERVED	NO CONNECTION.
15	N/C RESERVED	NO CONNECTION.

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5723/5724/5753/5754 INTERFACE CIRCUITS
(STANDARD INTERFACE)

FIG. 1 TEMPERATURE TEST POINT

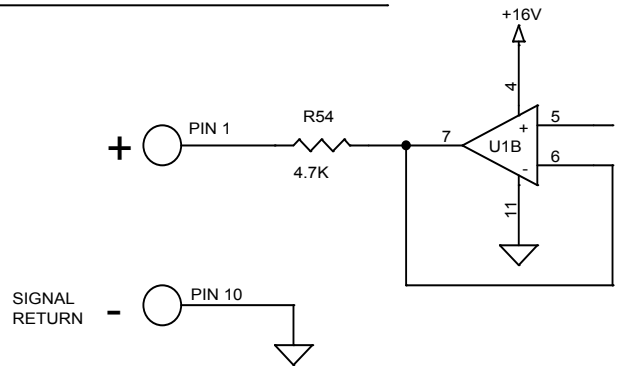
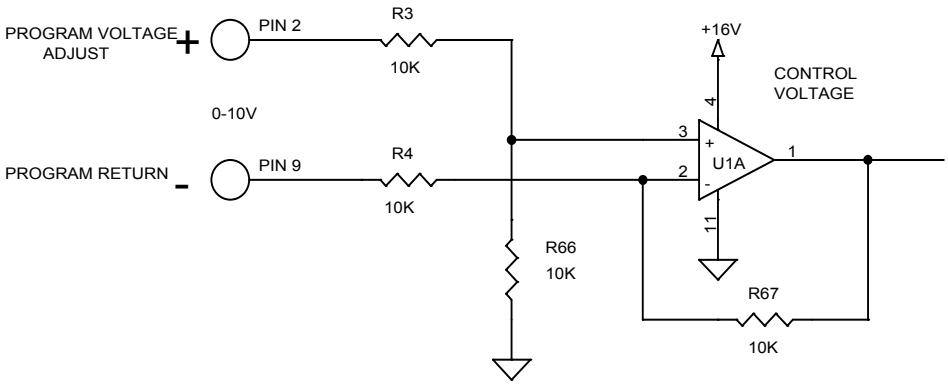


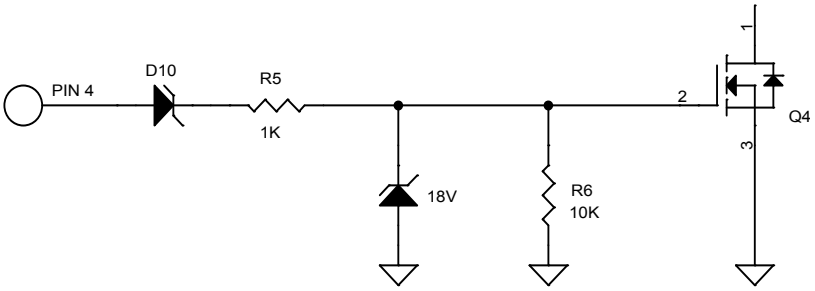
FIG. 2 PROGRAM VOLTAGE



0-10V CONTROL R66,67 = 10K

0-5V CONTROL R66,67 = 20K

FIG. 3 INHIBIT



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5723/5724/5753/5754 INTERFACE CIRCUITS
(STANDARD INTERFACE)

FIG. 4 END OF CHARGE

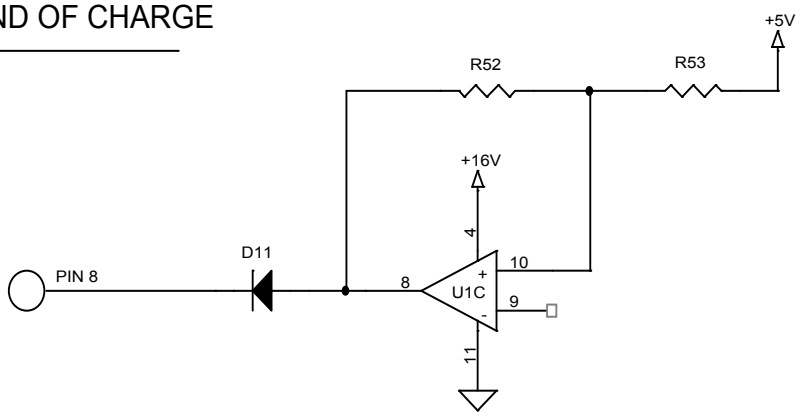


FIG. 5 +5V REFERENCE

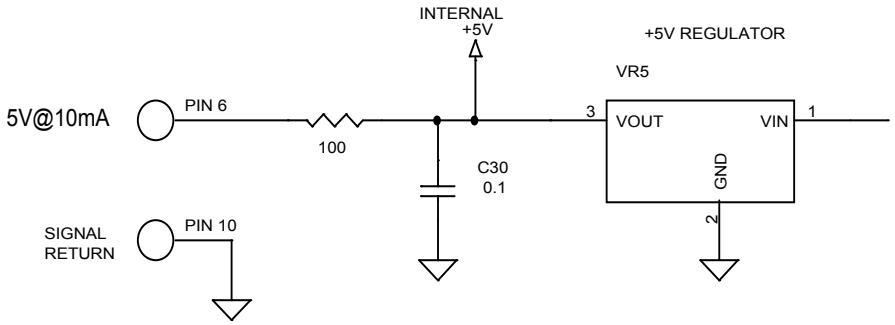
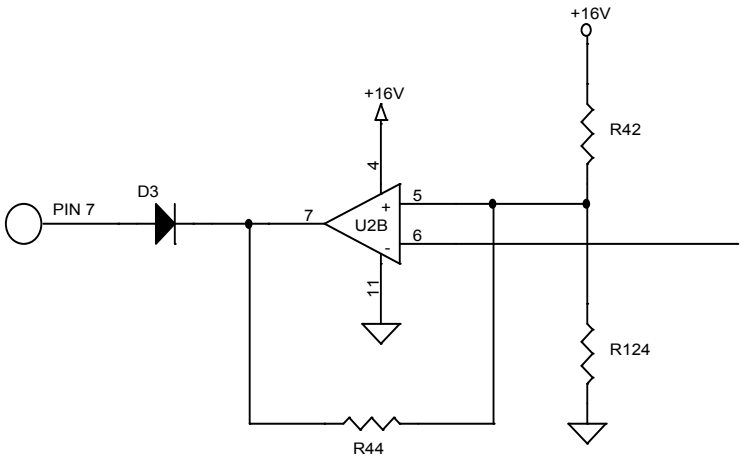


FIG. 6 OVERTEMP STATUS



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The following connections are available when the Optional I/O (-2) Interface is chosen:

PIN	Signal Name	Description
1	INHIBIT	3.5 to 30V input to inhibit charger. 10kΩ load impedance (reference Figure 1).
2	N/C RESERVED	NO CONNECTION.
3	OVERTEMP STATUS IND	Internal 1kΩ resistor to +12V. FET output rated at 40V, 100mA. Fault indicated by low condition (reference Figure 2). This is a warning indicator only.
4	PROGRAM RTN / GND	Differential input return for program voltage. Requires no connection if unit is configured as single ended or internal control (reference Figure 3).
5	PROGRAM VOLTAGE	0 to 10V control differential input for 0 to 100% rated output voltage (reference Figure 3).
6	OVERVOLTAGE STATUS IND	Internal 1kΩ resistor to +12V. FET output rated at 40V, 100mA. Maximum output voltage can be programmed by an internal 10-turn potentiometer. If this voltage is exceeded a fault will be indicated by a low signal at this pin. The charger will also be inhibited to prevent it from exceeding this voltage. The over-voltage protection potentiometer is accessible at the hole labeled OVP Adjust. Counter-clockwise motion of this potentiometer is required to increase the over-voltage set point (reference Figure 4).
7	VOUT PEAK HOLD	Output monitors output voltage with a peak-hold circuit. 0 to 10V represents 0 to 100% rated output voltage. To ensure good stability, the time constant of this circuit is ≈ 2 min. This should be considered when lowering the operating voltage from a higher value. For a direct reading of the output voltage, pin 8 can be monitored (reference Figure 5).
8	Vout MONITOR	Output which directly monitors output voltage. 0 to 10V represents 0 to 100% rated output voltage (reference Figure 6).
9	+12VDC	12V output capable of delivering 30mA (reference Figure 7).
10	N/C RESERVED	NO CONNECTION.

11	+10V REFERENCE	10V output capable of delivering 2mA (reference Figure 8).
12	SIGNAL RETURN	Signal return for any external control circuitry. Common to pin 14.
13	END OF CHARGE IND	Internal 1KΩ resistor to +12V. FET output rated at 40V, 100mA. When PFN is charged to programmed voltage the output is pulled low (reference Figure 9).
14	SIGNAL RETURN	Signal return for any external control circuitry. Common to pin 12.
15	GROUND INTERLOCK	Must be connected to signal return pin or charger will remain inhibited (reference Figure 10).

5723/5724/5753/5754 INTERFACE CIRCUITS
(OPTIONAL INTERFACE)

FIG. 1 INHIBIT

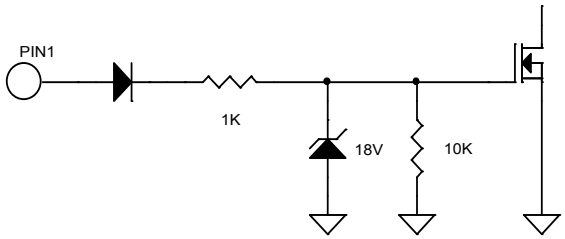


FIG. 2 OVER TEMP STATUS

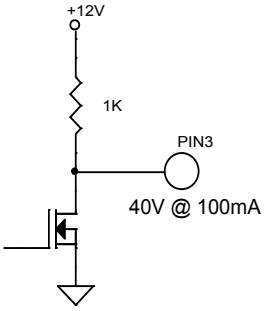
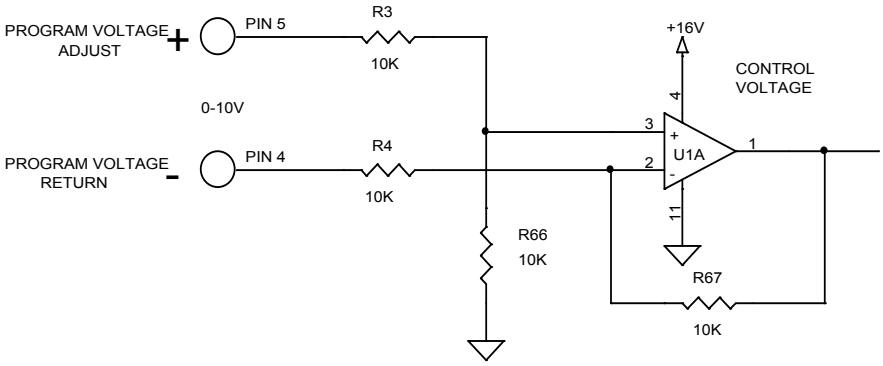
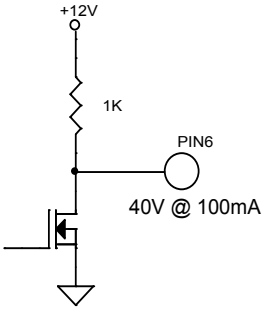


FIG. 3 PROGRAM VOLTAGE



0-10V CONTROL R66,67 = 10K
0-5V CONTROL R66,67 = 20K

FIG. 4 OVER VOLTAGE STATUS



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5723/5724/5753/5754 INTERFACE CIRCUITS
(OPTIONAL INTERFACE)

FIG. 5 VOLTAGE PEAKHOLD

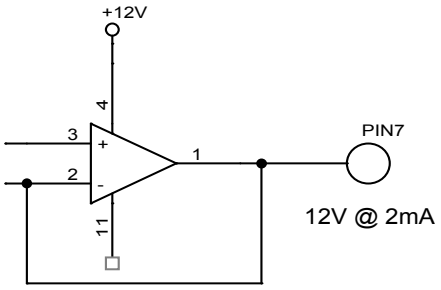


FIG. 6 VOLTAGE MONITOR

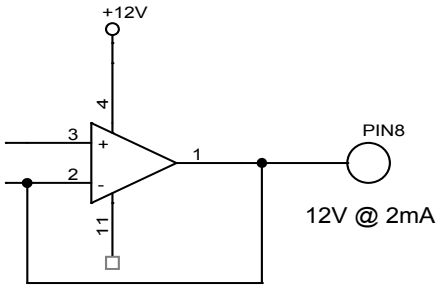
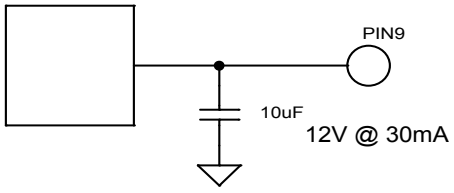


FIG.7 +12VDC



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5723/5724/5753/5754 INTERFACE CIRCUITS
(OPTIONAL INTERFACE)

FIG. 8 +10VDC REFERENCE

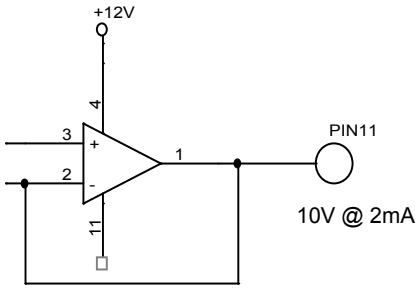


FIG.9 END OF CHARGE

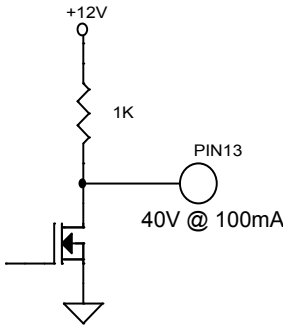
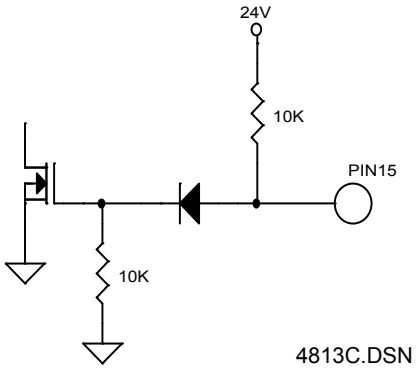


FIG.10 GND INTERLOCK



SECTION 4

OPERATION

4.0 OPERATION

4.1 Power Up Sequence

Care must be exercised in the power up sequence. This is especially true with a microprocessor-controlled system. The proper power up sequence is as follows:

All external control circuitry should be powered up and stable before applying AC to the power module. Inhibit should be high and Program voltage should be 0V. Once these conditions are true, the AC mains power input may be applied.

4.2 Power Down Sequence

Inhibit should be raised high and program voltage should be set to 0V. The AC mains power may then be removed.

4.3 Cooling

Adequate cooling must be maintained at all times the power module has power applied to it. An inadequate airflow will result in the temporary shutdown of the power module.

Ducting should be fabricated to ensure the maximum airflow through the power module. The switching FET heat sinks, which are visible on the end with the AC IN connector, should be oriented toward the cooler air.

SECTION 5

MAINTENANCE

5.0 MAINTENANCE

No maintenance is required.

CAUTION

To prevent electric shock, do not remove screws. There are no user serviceable parts inside. Refer all servicing to factory qualified service personnel.

SECTION 6

DOCUMENTATION

6.0 DOCUMENTATION

Temperature Test Point Data

Power Declination Curves

Declaration of Conformity

International Representatives

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TEMPERATURE TEST POINT DATA

TEMPERATURE IN CENTIGRADE	TEST POINT VOLTAGE	TEMPERATURE IN CENTIGRADE	TEST POINT VOLTAGE
25°	5.28V	50°	7.23V
26°	5.38V	51°	7.29V
27°	5.48V	52°	7.34V
28°	5.57V	53°	7.39V
29°	5.66V	54°	7.44V
30°	5.76V	55°	7.49V
31°	5.85V	56°	7.55V
32°	5.94V	57°	7.58V
33°	6.03V	58°	7.62V
34°	6.11V	59°	7.67V
35°	6.20V	60°	7.71V
36°	6.29V	61°	7.75V
37°	6.36V	62°	7.79V
38°	6.44V	63°	7.82V
39°	6.51V	64°	7.85V
40°	6.59V	65°	7.89V
41°	6.67V	66°	7.92V
42°	6.74V	67°	7.95V
43°	6.81V	68°	7.99V
44°	6.88V	69°	8.02V
45°	6.94V	70°	8.05V
46°	7.00V	71°	8.07V
47°	7.06V	72°	8.10V
48°	7.12V	73°	8.13V
49°	7.17V	74°	8.15V

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