

OPERATING MANUAL
CBA 400M-110
10kHz to 400MHz 110 watt AMPLIFIER

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WARRANTY

HARDWARE: Teseq Limited (The Company) warrants its amplifiers to be free from defects in workmanship and materials, under normal use and service, for three years from the date of purchase from The Company or its Authorised Agent.

If a product does not operate as warranted during the warranty period, The Company shall, at its option, repair the defective product or part, deliver an equivalent product or part to replace the defective item, or refund the purchase price paid for the defective product. Transportation of the defective product or part to the factory or service centre is to be pre-paid by the customer. All products that are replaced will become the property of The Company. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

All information in this manual is given in good faith. However, The Company shall not be liable for any loss or damage whatsoever arising from the use of this manual, the product described in it or any errors or omissions in either.

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SAFETY INFORMATION



This apparatus has been designed and tested in accordance with BS EN 61010-1, and has been supplied in a safe condition. This manual contains some information warnings which must be followed to ensure safe operation, and to retain the apparatus in a safe condition.

This apparatus does not incorporate components liable to explode or implode during normal operating conditions.

In normal operating conditions this apparatus does not liberate injurious or poisonous gases.

Sound levels of this apparatus after installation in a rack are below 85dBA, as required by EN61010-1. However local regulations may have a lower limit or the system as a whole may exceed the local limit. In this case appropriate action should be taken, i.e. of use of any protective equipment required by local regulations.

This apparatus is of Installation Category 2.

WARNING

This apparatus is capable of delivering harmful levels of radio frequency power. Ensure at all times during operation that the RF output is properly terminated with an adequately rated termination or transducer, and that the cables and connectors attached to the apparatus are in good condition.

The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. The protective action must not be negated by the use of an extension cord without a protective conductor.

The opening of covers or removal of parts is likely to expose live parts.

This apparatus must be disconnected from all voltage sources before it is opened for adjustment, replacement, maintenance or repair.

Make sure that only fuses of the required rated current and of the specified type are used for replacement. The use of makeshift fuses and the short-circuiting of fuse holders is prohibited.

SECTION 1 INTRODUCTION

CBA 400M-110 INTRODUCTION

The CBA 400M-110 is an amplifier capable of supplying 110 watts of RF power into a 50 ohm load over the frequency range 10kHz to 400MHz, during the course of EMC tests on electrical equipment. The amplifier is designed with sufficient gain such that it may be used with normal output levels of signal sources. A safety interlock system on the rear panel is also provided, two options are available, short circuit or open circuit to mute.

The unit is powered from a switched mode power supply for high efficiency, high power factor and wide voltage range operation. The unit is air cooled with integral fans, and is protected against faulty cooling by excess temperature sensing.

A front panel indicator is provided to indicate over-temperature. The amplifier is designed for rugged operation into a variety of loads. The amplifier is primarily intended for use as a power source for EMC susceptibility testing, but is also applicable to other systems requiring a wide-band linear amplifier.

This amplifier is designated as 'professional equipment' and should not be operated by untrained staff.

As this product has the capability to generate high levels of RF energy it is not intended for use in a residential environment. Although harmful levels of RF power are not emitted by the amplifier, poorly screened or matched cables can radiate in use and adequate precautions need to be taken to mitigate this. This may include the use of double screened cables or locating the amplifier inside a secondary screened enclosure.

Potential or theoretical hazards

Threat	Precaution
Exposure of personnel to high RF fields produced by an antenna connected to the output of the amplifier	Ensure that the antenna is inside a screened enclosure and fit an interlock to the entry door to prevent access while the amplifier is operating
RF burns caused by contact with the antenna connected to the output of the amplifier	Ensure that the antenna is inside a screened enclosure and fit an interlock to the entry door to prevent access while the amplifier is operating
Amplifier self-oscillation caused by feedback from un-terminated connectors	This is an unlikely but theoretical possibility. Always ensure that the amplifier input is terminated either by the system signal generator or by a suitable RF load/attenuator before switching the amplifier on.
Arcing due to high RF voltages present at the output connector	Always ensure that the output of the amplifier is terminated either by the system antenna or a suitable High power RF load or attenuator.

SECTION 2 UNPACKING AND INSTALLATION

UNPACKING

The CBA 400M-110 package contains:-

- 10kHz to 400MHz, 110W Amplifier (CBA 400M-110)
- 10A Power Cable as appropriate:
 - (UK)
 - (USA / JAPAN)
 - (EUROPE)
- Spare fuse T 10A H 250V
- CBA 400M-110 Operating Manual (this document)
- Calibration Report

If any signs of damage are found, no attempt should be made to install the instrument, which should be returned to Teseq EMC Systems or their agent. If the shipping carton has been damaged, retain the shipping carton and packing material for the carrier's inspection. Check that the equipment is complete as in the packing list above.

INSTALLATION

WARNING

This instrument must be earthed.

SECTION 3 OPERATION

FRONT PANEL

STANDBY/OPERATE SWITCH

Push button toggles between standby and operate modes

POWER INDICATOR

Green:

Flashing green indicates standby mode.

Continuous green indicates operate mode



INTERLOCK INDICATOR

Yellow:

Illuminated if the external interlock (rear panel) has been activated. Amplifier will be in non-operating mode.

FAULT INDICATOR

Red:

Should the amplifier be subject to a failure in the cooling system (either by a fan failure, inadequate air supply or excess ambient temperature) this indicator will illuminate and the amplifier gain stages will all be turned off.

LOCAL LOCKOUT INDICATOR

Yellow:

Illuminated if local lockout has been implemented by external software, Standby/operate button is disabled.

Note: this indicator is only present on models with the optional USB control interface

RF INPUT (depending on model)

The RF input will accept a signal from an RF generator. This input must be within the operating frequency range. An amplitude of up to 0dBm will be sufficient to saturate the amplifier. Operation outside the specified frequency range should not be attempted, and may subject the amplifier to undue internal stress.

RF OUTPUT (depending on model)

This connector must be suitably terminated at all times during operation. Ensure that the cable and load are all capable of handling the power available. On no account operate the amplifier without a proper termination or defective cables or connectors. The centre conductor of the RF output represents a severe burn hazard to personnel.

AIR INLET

The amplifier depends upon a free air supply for cooling. Ensure that the front air inlet is not restricted.

Should the amplifier be subject to a failing in the cooling system, the Fault Indicator will illuminate and the amplifier gain stages will all be turned off. This action is non-latching, so the gain stages will come on again when the amplifier has cooled down.

REAR PANEL

MAINS POWER SWITCH

This switch isolates all power from the amplifier, when switched on, the amplifier will power up in standby mode.

MAINS INPUT

The mains input is an IEC 60320 type. The cable attached to the mains input must be rated at 10A to ensure proper operation at the minimum line voltage of 85V ac. The fuse-holder is integral with this mains connector. Use fuse type T 10A H 250V.

INTERLOCK

Two BNC connectors are provided labelled INTERLOCK and INTERLOCK. In order for the amplifier to be in operating mode INTERLOCK must be short Circuit and INTERLOCK must be open Circuit. A short circuit BNC is supplied with the amplifier fitted to the INTERLOCK connector therefore the amplifier will be in a normal operation condition as delivered.



INPUT/OUTPUT CONNECTORS (depending on model)

The RF input and output connectors may optionally be placed on the rear panel if selected at the time of ordering.

FAN OUTLET

The amplifier depends upon a free air supply for cooling. Ensure that the fan outlets are not restricted.

SECTION 4 SPECIFICATION

The following specification applies over the operational temperature and frequency range unless otherwise stated, and does not include the characteristics of connecting cables.

Frequency Range (instantaneous)	10kHz-400MHz
Rated Output Power	110W minimum
Output Power at 1dB Gain Compression	80W minimum
Gain	51dB
Third Order Intercept Point	61dBm
Gain Variation with Frequency	±2dB
Harmonics at 100W Output Power	Better than -20dBc
Output Impedance	50 Ohms
Stability	Unconditional
Output VSWR Tolerance	Infinity:1
Input VSWR	2:1
RF Connector Style	Type N female
Safety Interlock	BNC female
USB Interface	Optional

EMC and Safety

Conducted and Radiated Emissions	EN61326 Class A
Conducted and radiated immunity	EN61326: 1997 Table 1
Mains harmonic currents	EN61000-3-2
Voltage fluctuations and flicker	EN61000-3-3
Safety	EN61010-1

Power

Supply Voltage (single Phase)	100-240V ac (+/-10%)
Supply Frequency Range	47-63 Hz
Supply Power	<1 kVA
Mains Connector	IEC320

Environmental

Operating Temperature Range	0-40°C
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Mechanical

Case Dimensions	19 inch, 4U case, 440mm deep
Weight	18 kg

Options (selected at time of ordering)

341-745	Bench model with front panel mounted input/output connectors
341-845	Rack mountable with front panel mounted input/output connectors
341-945	Rack mountable with rear panel mounted input/output connectors

Notes

- 1 The third order intercept point is a nominal value, as its calculation depends upon the power level at which distortion measurements are made.
- 2 Output VSWR tolerance is specified for excitation within the permitted levels and frequency range.

