



ML-CSA 4500 4G 5-Band Cell Signal Amplifier *with Passive Bypass Technology*

User Guide

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1. Overview

The ML-CSA 4500 4G (3G & 2G compatible) Cell Signal Amplifier is a high performance, microprocessor controlled, bidirectional RF amplifier. This amplifier boosts signal in 5 Bands: 700Mhz, 850Mhz, 1900Mhz, and 1700/2100Mhz which covers all North American Carrier frequency bands. The amplifier has an automatic gain and oscillation control system that will automatically adjust the gain and the output power if a signal anomaly occurs. This amplifier is designed to operate as a direct connect unit within a cellular system, for maximum performance in weak signal coverage areas. The input power requirements for the amplifier are positive 8.0 to 32.0 volts DC (negative ground).

2. Parts List

Depending upon the connector type of the cellular device, Multi-Link can customize the M2M kit to include the appropriate adapters to ensure a seamless and quick installation. Adapter types include, but are not limited to SMA, RP-SMA, MMCX, MCX, FME, and TNC.

<p>1. ML-CSA 4500 Amplifier Unit</p>  <p>A rectangular, black metal amplifier unit with a white label. The label features the Multi-Link logo and the text "M2M CELL SIGNAL AMPLIFIER with Passive Bypass Technology". There are two SMA connectors on the front panel and a power input on the side.</p>	<p>2. AC/DC Power Adapter Part# MSE-6085-001</p>  <p>A black AC/DC power adapter with a two-prong AC input and a DC output cable with a barrel jack connector.</p>
<p>3. Hardwire DC Power Cable- Part# CBL-5214-001</p>  <p>A black hardwire DC power cable with a barrel jack connector on one end and exposed DC power wires on the other.</p>	<p>4. Mag-Mount 2dBi Outdoor Antenna Part# ML-ANT-MM01</p>  <p>A black magnetic-mount outdoor antenna with a circular base and a vertical antenna element.</p>
<p>5. SMA-to-SMA Device Cable (For SMA device) Part# CBL-SMA</p>  <p>A black SMA-to-SMA device cable with SMA connectors on both ends.</p>	<p>6. Optional : SMA-to-MMCX Device Cable (For MMCX device) Part# CBL-MMCX</p>  <p>A black SMA-to-MMCX device cable with an SMA connector on one end and an MMCX connector on the other.</p>

3. Standard Installation



Disclaimer: Installation of this device requires knowledge of basic electrical and experience with installing electronic devices. We recommend seeking a professional installer if you are not accustomed to installing electronics or high tech devices. Installation of this device is at your own risk. Multi-Link, Inc. assumes no responsibility for the installation or improper operation of this device. Got questions? Contact Multi-Link Tech Support: 800-535-4651 or techsupport@multi-link.net , Monday through Friday; 9 am - 5 pm Eastern Time.

Typical Installation Diagram



1. Connecting to Amplifier

A) If connecting to a Cellular Modem (with SMA connection), connect the SMA to SMA device cable (#5 on Parts List) to the ML-CSA 4500 Amplifier connector marked "Device".

B) If connecting to a Cellular Module (with MMCX connection), connect the SMA-to-MMCX device cable (#6 on Parts List) to the ML-CSA 4500 Amplifier connector marked "Device."



2. Connecting to Cell Device

A) Connect the SMA end of the SMA to SMA device cable to the Cellular Modem antenna connection.



B) Connect the MMCX end of the SMA to MMCX device cable to the Cellular Module.



3. Mounting the Antenna

A) Fixed - Mount the Outdoor Signal Antenna (#4 on Parts List) vertically on any metal surface.



B) Mobile - Mount the Outdoor Signal Antenna (#4 on Parts List) vertically on any metal surface on the roof, hood or trunk of the vehicle.



- 4. Connecting the Antenna - Connect the Outdoor Signal Antenna connector to the Cell Signal Amplifier's SMA connector marked "Antenna".**



- 5. Connecting the Power Supply**

A) For AC - Plug the AC Adapter (#2 on Parts List) into a nearby wall outlet.

B) For DC (Mobile) - Plug the 12V Hardwire DC Cable (#3 on Parts List) into the vehicle fuse block. You must connect the red wire to a positive terminal from the fuse panel with a 3 Amp fuse rating. The black wire should be attached to a ground of the vehicle. Power may also be provided to the amplifier using a 12V cigarette lighter adaptor.

AC Adapter



DC Cable



Insert power plug into the amplifier and observe LED indicator lights for status, refer to “LED Diagnostics” section for explanation.



4. LED Diagnostics

Once the amplifier is installed properly and power is applied, the LEDs on DEVICE side of unit will both turn on followed by the green LED flashing. The green LED will flash while the amplifier increases its gain to the optimum level. The red LED may also flash during this stage while the gain (power) is properly set on the amplifier. When power control is established, the green LED will remain constantly on. You may see the green and red LEDs flash back and forth, THIS IS NORMAL. In areas where the cellular network is adequate, the amplifier will maintain a maximum power level acceptable for normal operation. **If the red LED is constantly on and the green LED is off, the amplifier has detected a fault.** The amplifier will shut down automatically and restart. If the fault persists, reposition the antenna until normal operation is achieved. Once normal operation is established, you may permanently mount the antennas in the locations you chose in the prior steps.

5. Diagnostic LED definitions

Red Green

- ● Solid Green and Red – LED test, the unit is initializing
- ● Solid Green – Normal operation
- ● Flashing Green – Normal operation, increasing gain setting
- ● Solid Green and Flashing Red – Normal operation, decreasing gain setting
- ○ Solid Red and no Green – Fault detected (Unit will shut down until power is cycled.)

6. PATENTED Passive Bypass Technology

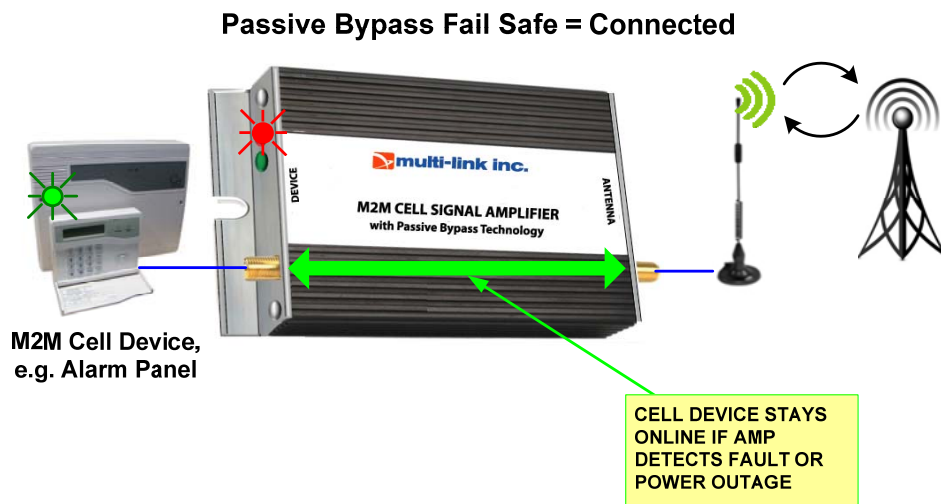
The ML-CSA 4500 amplifier is equipped with Patented Passive Bypass technology. This feature allows the amplifier to passively bypass itself and become merely a pass through cable during these occurrences:

- **When amplification is not necessary, e.g. existing cell signal strength is adequate**
- **When connected cell device goes into “Stand-By” Mode**
- **When there is a power loss to amplifier**
- **When a fault is detected**

Passive Bypass technology is useful in applications where the amplifier is mobile, moving in and out of poor signal areas. The amplifier will bypass itself when in close proximity to cell towers. This serves as a safeguard feature, completely eliminating any potential for disruption to the cell network.

This unique feature is also extremely useful in fire & security system installations where a connection with the antenna must always be maintained, even with loss of power.

In other applications, e.g. remote solar-powered equipment, the cell device alternates from “Stand-By” to “Active” modes, transmitting data as needed. ML-CSA 4500 is designed to stay in Passive Bypass Mode if the connected system is in “Stand-By” and become active when the connected system is “Active”.



7. ML-CSA 4500 Specifications

- Frequency Range: Band 2, Band 4, Band 5, Band 13, Band 17
- Uplink (MHz) 698-175; 776-787; 824-849; 1850-1915; 1710-1755
- Downlink (MHz) 728-746; 746-757; 869-894; 1930-1995; 2110-2155
- Rated Uplink Maximum Output Power: 27dBm
- Rated Downlink Maximum Output Power: -20dBm
- Current Draw @ 12VDC: Idle: 275 milliamperes; Max: 1 Amp
- Power Requirement: 8.0 to 36.0 volts DC (negative ground), Connector is center positive
- Nominal Gain: 15dB
- Input/output Impedance: 50 Ohms
- Rated Mean Output Power: 27dBm

FCC ID: XS7-WRE5500

IC ID: 8918A-WRE5500

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The term "IC:" before the radio certification number only signifies that Industry of Canada technical specifications were met. The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device.

La puissance de sortie nominale indiquée par le fabricant pour cet appareil concerne son fonctionnement avec porteuse unique. Pour des appareils avec porteuses multiples, on doit réduire la valeur nominale de 3,5 dB, surtout si le signal de sortie est retransmis et qu'il peut causer du brouillage aux utilisateurs de bandes adjacentes. Une telle réduction doit porter sur la puissance d'entrée ou sur le gain, et ne doit pas se faire au moyen d'un atténuateur raccordé à la sortie du dispositif.

FCC Regulatory Guidance: Multi-Link's ML-CSA 4500 operates under the rules and regulations as provided by the Federal Communications Commission (FCC). For more information on these rules and regulations, please contact the FCC directly at (888)-225-5322.

This is a CONSUMER device.

BEFORE USE, you **MUST REGISTER THIS DEVICE** with your wireless provider and have your provider's consent. Most wireless providers consent to the use of signal boosters. Some providers may not consent to the use of this device on their network. If you are unsure, contact your provider.

You **MUST** operate this device with approved antennas and cables as specified by the manufacturer. Antennas **MUST** be installed at least 20 cm (8 inches) from any person.

You **MUST** cease operating this device immediately if requested by the FCC or a licensed wireless service provider.

WARNING: E911 location information may not be provided or may be inaccurate for calls served by using this device.

8. Antennas



You MUST operate this device with approved antennas and cables as specified by the manufacturer. Antennas MUST be installed as least 20 cm (8 inches) from any person.

Included Antenna: *ML-ANT-MM01 Mag Mount Antenna*

Included Cable: *CBL-SMA-SMA (or CBL-SMA-MMCX)*

9. Optional Accessories

In addition to the parts listed on page 3, Multi-Link can provide cables and accessories for a variety of applications and installations. Visit www.multi-link.net or call 800-535-4651 for more information.

Accessories include, but not limited to, the following:

ML-CSA Accessories	Vendor Part #
"Cigarette Lighter" 12V Power Adapter	ML-PWS-CL12
Low Profile Auto Roof Mount Antenna	ML-ANT-RM01
UL Listed Locking Enclosure	ML-ENCL-UL
Bracket Mount 2dBi External Antenna	ML-ANT-BM01
Cable & Adaptor Accessories	Vendor Part #
Jumper Connector Cable – SMA to SMA	CBL-SMA
Jumper Connector Cable – SMA to TNC	CBL-TNC
Jumper Connector Cable – SMA to MMCX	CBL-MMCX
Jumper Connector Cable – SMA to U.FL	CBL-U.FL
Adaptor connectors – SMA(M) to TNC(M)	SMA(M)-TNC
Adaptor connectors – SMA(F) to TNC(M)	SMA(F)-TNC
Adaptor connectors – TNC(M) to N(M)	TNC-N
Adaptor connectors – TNC(M) to TNC(M)	TNC-TNC

10. Warranty Information

Multi-Link, Inc. warrants that this product is free from defects in materials and workmanship for two years from the date of purchase. Within this period, Multi-link, Inc. will, at its sole option, repair or replace any components which fail during normal use. Multi-Link, Inc. will provide, without charge, the parts and labor necessary to rectify any such defect. Multi-Link, Inc. will not be responsible for transportation costs. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alterations or repairs. .

Repairs have a 90 day warranty. If the unit sent in is still under its original warranty, then the new warranty is 90 days or to the end of the original one year warranty, depending upon which is longer.

Multi-Link, Inc. retains the exclusive right to repair or replace the product or offer a full refund of the purchase price at its sole discretion. Such remedy shall be your sole and exclusive remedy for any breach of warranty. Multi-Link, Inc. shall not be liable for any incidental or consequential damages for breach.

Procedure for Claims under Limited Warranties

To obtain warranty service, an original or copy of the sales receipt from the original retailer is required. To obtain warranty service, follow these two steps:

1. Contact Multi-Link, Inc. Tech Support at 800-535-4651 to request a return authorization number (RMA).
2. Once you have obtained an RMA#, ship the unit, copy of the sales receipt, along with the RMA number to:

Multi-Link, Inc.
RMA# (List RMA# provided to you)
122 Dewey Drive
Nicholasville, KY 40356
800-535-4651