



## M4B SERIES



**Rackmount option**



**Wall-mount option**

The CTI MARK-IV Broadband Bi-Directional Amplifiers (M4-BBDA) are Class-B Signal Boosters per FCC 90.219 definition.

Exceptional performance, long term reliability, and high efficiency are achieved by employing advanced matching networks and combining techniques, EMI/RFI filters, machined housings, and qualified components.

An optional RF-over-Fiber transceiver with a very wide dynamic range that allows the transmission of RF to greater distances using Single-mode optical links, with separate Tx/Rx Fiber links at typical 1310 nm wavelength (1510 nm and WDM available).

The BDAs can be configured with low/limited RF gain for use in daisy-chain inline-coax applications or through a single-mode optical link upon request.

The BDAs can be provided with or without Multi-carrier Linear Power Amplifiers (MLPAs).

The RF chassis can support up to two BDAs in certain configurations.

## Highlights & Applications:

- **Mission Critical Public Safety Industrial Signal Booster, outstanding in the market.** We will welcome any benchmark test challenge.
- **Single-band or dual-band** models for VHF, UHF, 700, 800 and 900 MHz PLMR. **Unidirectional** versions are also available.
- **Fiber-Optic fed BDA options available.**
- **Meets NFPA72/1221/5000 and IFC 510.1 fully compliant "Emergency Responder Communications Enhancer Systems" (ERCES/ERRCS).**

Canam can deliver fully integrated system including other rated products such as Dedicated Radio Consoles (DRC), ANNUNCIATOR panels, AC UPS or DC Battery Backup Units (BBU), Antenna Monitors, Enclosures, and interfaces with the FACP or SCADA.

- **Emergency Remote RF Power OFF (EPO, Mute/Standby)**, via discrete I/O or software.
- **Delivers and Exceeds the FCC part 90.219(d) rules** for Good Engineering Practices, while simultaneously transmitting 10 or more carriers at 5 or 20 watts actual composite output power.
- **Supports all analog and digital modulation formats, including TDMA.**
- **Typical 30 dB small signal gain per path, 70dB max.**
- **Easily replaceable modular plug-in parts. Low-cost maintenance.**
- **Fully network-able device** with embedded webserver, Optional SNMP V3 (authenticating and encrypting data packets) Agent and Traps, ModBus and ModBus/Moscad NYCT MCAS interpreter, MQTT Client.
- **Cybersecurity** Based on industrial framework, with optional TPM encryption.
- **Canam's Radio Network Management System (NMS)** is available for systems.
- **Several Options available**, consult Canam. Examples:
  - Built-in RF-over-Fiber transceivers.
  - Paired BDAs assembly for redundancy with RF Redundancy Switch.
  - Dual Power Supply Units, AC or DC input. (rackmount version)



• **KEY Special Features (1)**

OP#	Key Feature
OP1	Built-in RF/Fiber
OP2	Preselector RF filters, Duplexers or Multiband combiners (multiplexers)
OP3	N+N redundancy
OP4	Modbus/Moscad NYCT MCAS interpreter
OP5	Antenna Monitor accessory
OP6	SNMP

OP#	Key Feature
OP7	Modbus I/O Extender
OP8	Cybersecurity
OP9	MQTT
STD	Tx ON/OFF (remote shutdown)
STD	Configurable “building-blocks”
STD	Software-configurable
STD	External CAN bus
STD	NTP Server Client

**(1) PLEASE CONSULT M4DBDA SERIES TECHNICAL BROCHURE FOR ADDITIONAL INFORMATION.**

• **RF Specifications**

Parameter	Specification
Available Frequency bands (ranges) <b>Note:</b> There are single-band or dual-band models. Contact Canam.	150-174, 380-430, 440-450, 450-470, 470-490, 490-512, 769-775, 799-805, 806-816, 851-861, 896-901, 935-940 MHz Custom passband windows can be accommodated within the uplink/downlink sub-bands.
Number of bands	Up to 2 bands. Accommodate 4 paths total (2 UL and 2 DL)
Supported modulation formats	All analog and digital modulation formats, including time-multiplexed as FDMA, TDMA, P25-Ph1/Ph2, TETRA, NXDN, Mototrbo DMR.
In-Band and Out-of-band spurious & noise outputs are FULLY COMPLIANT with the new FCC §90.219(d) rules for Good Engineering Practices.	<ul style="list-style-type: none"> <li>○ In-Band IMs: &lt; -30 dBm over 10 kHz BW</li> <li>○ In-Band Noise Floor: &lt; -43 dBm over 10 kHz BW</li> <li>○ Out-of-Band: &lt; -70 dBm over 10 kHz BW</li> </ul>
RF Delay	< 1 usec
Maximum input power (composite) per path for no-damage	-20 dBm (typ.), or custom factory-build option
Uplink Noise Figure (for low level signal outside of ALC range) (without external filtering or padding)	3 dB typical for UHF & 700/800 MHz 5 dB typical for VHF only
Output Multi-Carrier Automatic Level Control Set-Point	+38 dBm (UHF, 700/800 MHz) +30 dBm (VHF only) -20 dBm (to feed fiber transmitter)
Wideband Downlink and Uplink RF Input Automatic Limit Control (iALC) range. Activation of the iALC does not create inter-modulation products or spurious outputs with levels greater than -60 dBc over the entire range of operation of the iALC, for any frequency spacing. It prevents internal saturation of the amplifier stages	30 dB (60dB max with Gain control combined)
Gain Control range (Uplink & Downlink)	30 dB, 1 dB digital step (60dB max with ALC combined)
System RF Input/Output Impedance	50 Ohm, 1.5:1 VSWR



Small Signal Gain	Downlink	Uplink
In-line configuration gain (all bands)	45 dB typ.	45 dB typ.
Fiber-fed configuration gain (all bands)	70 dB typ.	45 dB typ.

Output Power Ratings UHF & 700/800 MHz bands	Superior Power	High Power	Low Power
Multi-carrier Linearized Power Amplifier (MLPA) Output Power <sup>(2)</sup> .	> 200W (53dBm)	> 50W (47dBm)	> 1mW (0dBm)
Output MLPA IMD having 10 channels transmitting simultaneously ( <i>real application random channels spacing, 9 dB typ. Peak Average Power Ratio – PAR</i> )	≥60 dBc typ, 10CH @ +30dBm each (US)	≥60 dBc typ, 10CH @ +27dBm each (US) @ +25dBm each (EU)	≥60 dBc typ, 10CH @ -20 dBm each
VHF band			
Multi-carrier Power Amplifier (MCPA) Output Power <sup>(2)</sup> .	n/a	> 20W (43dBm)	> 1mW (0dBm)
Output MCPA IMD having 10 channels transmitting simultaneously ( <i>real application random channels spacing, 9 dB typ. Peak Average Power Ratio – PAR</i> )	n/a	≥60 dBc typ, 10CH @ +20 dBm each (US) @ +20 dBm each (EU)	≥60 dBc typ, 10CH @ -20 dBm each

<sup>(2)</sup> The deployed system output power level should be adjusted to comply with the market applicable limit for ERP, intermods and spurs. It depends on the number of carriers transmitting concurrently (at the same time) and the levels per carrier. Please ask CTI for scenarios.

**• Mechanical, Electrical & Environmental Specifications**

Parameter	Specification
Enclosure Rating	Wall-mount: UL50/50E NEMA Type 4X (IP67) rated enclosure. EIA Rackmount: NEMA Type 1 (IP20) equipment shell.
Optional dual independent power sources	Per NFPA, the BDA shall be powered from at least two independent power sources (one primary and one secondary), with 12hr minimum back-up time at full load.
AC/DC or DC/DC power supply unit (PSU) is UL/C-UL Recognized to UL IEC/EN 60950-1	Wall-mount: single PSU. Rackmount: OPTIONAL dual redundant PSUs in parallel.
Electrical Power requirements @ full load (actual power draw depends upon system configuration)	200-Watt, typ. Standard AC: 100 - 240 Vac 47/63 Hz OPTIONAL DC: 24Vdc (20-36) or 48Vdc (36-72)
Duty Cycle	100%
Outline dimensions	Wall-mount enclosure: 18.5in x 20.50in x 9.25in (LxWxD) 19in Rackmount unit: 4RU or 6RU high x 15in deep
Weight	Wall-mount: 95 lbs (45 kg) max. Rackmount: 75 lbs (30 kg) max.
RF connectors, including test ports.	Low-PIM N-Female. OPTIONAL: Low-PIM 4.3-10 DIN female for Main Ports.
MTBF at maximum output power, 100% duty cycle	RF –only: >50,000 hours. Fiber-fed: >40,000 hours
Operating ambient temperature range	-20 to +50° Celsius
Heat load	600 BTU/hr, typ.
Cooling	Wall-mount: Passive Convection Cooling. OPTIONAL: External IP67 fans on a front cover to improve thermal performance. Rackmount: Forced Ventilation (dual front & rear fans).

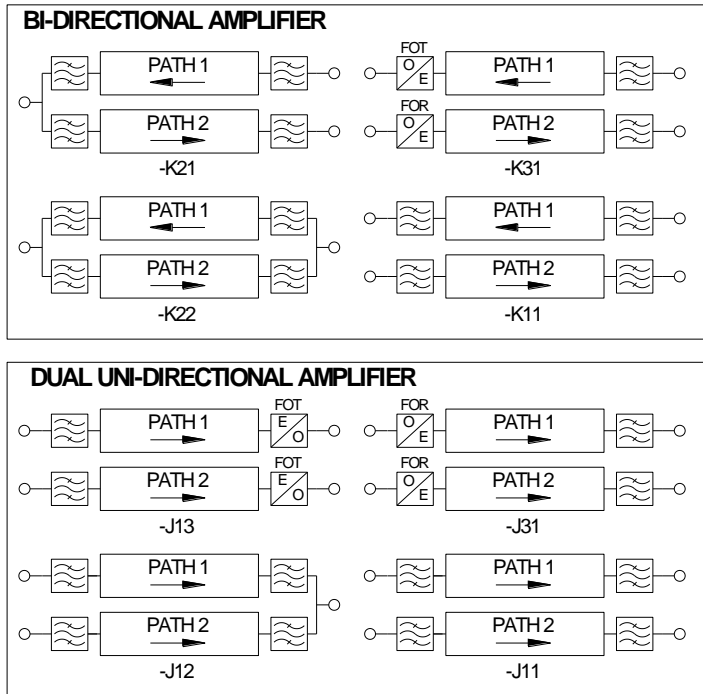


• Interfaces, Remote Control and Monitoring

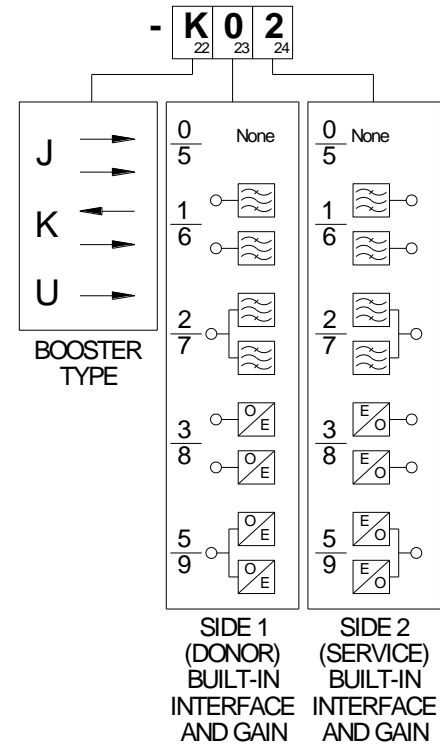
Parameter	Specification
Controller	Embedded website for easy configuration. SNMPv2, v3 & Notification Traps for integration with Canam's Network Management System (NMS) or with third-party managers. OPTIONAL: ModBus/Moscad plus NYCT MCAS interpreter.
Network remote control	Ethernet 10/100 RJ-45 port. TCP/IP: web server, SNMPv2, v3 & Notification Traps
LOGs with date and time stamp	Built-in real time clock with battery backup to keep the date and time. It also allows date and time synchronization with servers using the Network Time Protocol (NTP). The Events and Alarms Logs can be retrieved from the network interface.
Non-Intrusive RF test ports	OPTIONAL: Available upon request. SMA or Type-N (female), 50 Ohm.
HMI alphanumeric display	Rackmount: LCD on front panel Wall-mount OPTIONAL: external IP65-rated HMI, on the optional external fans cover.
Power ON & Summary Alarms visual indicators	Rackmount: LEDs on front & rear panels (blinking to indicate controller is running) Wall-mount: one LED on bottom panel, multicolor and blinking.
Factory-Programmable-function Discrete Digital I/Os, fully compliant NFPA72/1221 requirements for monitoring the BDA device.	Two separate sets of dry-contacts can be provided on different connectors, one to interface to the FACP/SCADA, the other one to drive an optional discrete Annunciator. <ul style="list-style-type: none"> <li>a) Four (4) DPDT relay outputs, dual form-C dry contacts (voltage-free).</li> <li>b) Optional Four (4) Supervised Inputs (optional Class-A or Class-B), with an ACK output each.</li> <li>c) Two (2) opto-isolated general-purpose inputs, perhaps for door tampering &amp; others.</li> </ul>
Health monitoring: several internal meters and sensors do monitor the status and trigger alarm conditions by user-defined thresholds.	Additional status conditions and all meters are shown in the embedded webpages and SNMP data, in addition to the alphanumeric human-machine-interface (HMI) display. Typical meters: Per Modules' Temperature, DC Current, DC Voltage, Input RF composite power, Output RF composite power, Receive Signal Strength Indicator level – RSSI per filter-window, among others. Additional alarm conditions: Low Forward transmit power, High Reflected Power or VSWR, Over-temperature, AC Power Loss, Fans failure, and other general-purpose inputs or custom conditions.
Standard cybersecurity	Role-based access control and privilege management. Critical data and system configuration backup and recovery function for rapid restoration. Tampering alarm: built-in for wall-mount, optional cabinet supervision for rackmount.



**TYPICAL SETUP EXAMPLES**



**SETUP CHART**

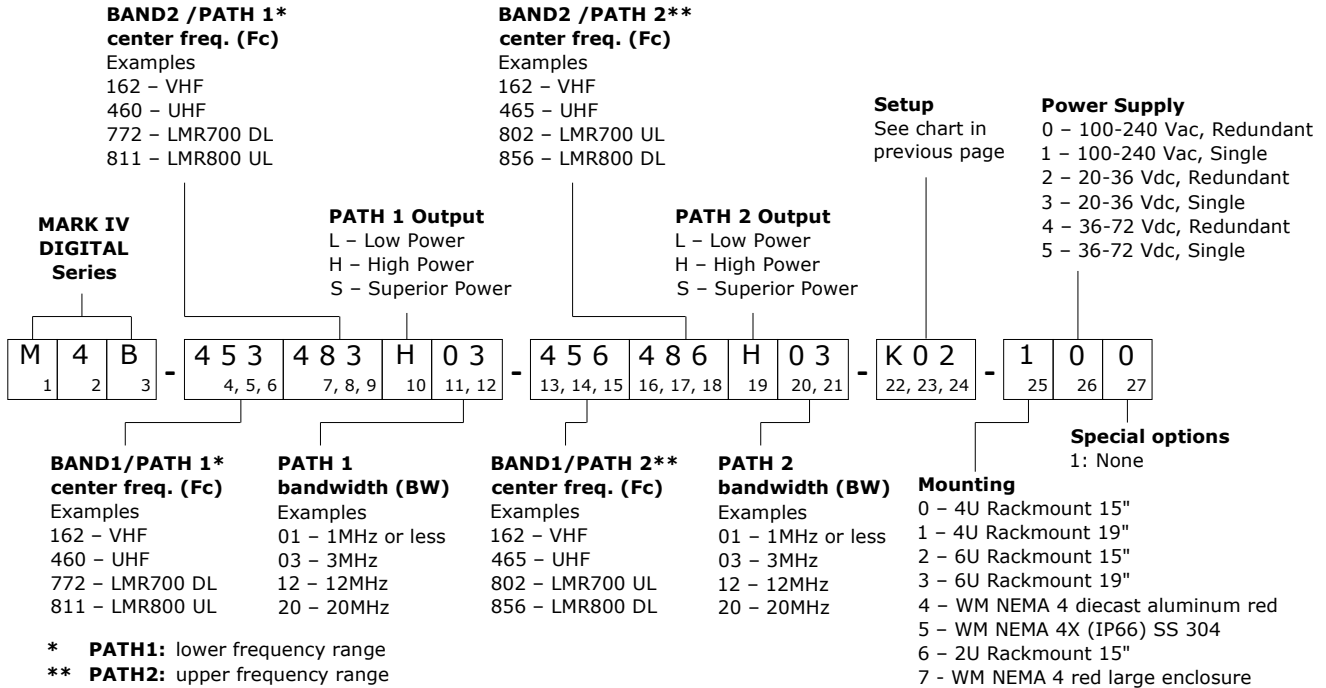


**Notes:**

1. Basic configurations -J00, -K00, -U00 could be omitted (leave blank). 45dB typ. gain, no built-in filters nor fibers.
2. Use lower numbers, -J, -K, -U [0,1,2,3,4][0,1,2,3,4] for 45 dB typ. gain configurations; higher numbers [5,6,7,8,9][5,6,7,8,9] for 70 dB typ. gain configurations.
3. For uni-directional amplifier (UDA) configurations: -U[0,1,3,5,6,8][0,1,3,5,6,8], for example: -U31, -U05.
4. Fiber transmitters (FOT) or receivers (FOR) are provided according to the signal path flow.
5. Pre-selector RF Band-pass filters could be built-in depending upon the selected enclosure size, the RF band and the selectivity requirements. Please consult Canam.



• Configuration Numbering (3)



Notes:

- Fields 7 ~ 9 and 16 ~ 18 are omitted (leave blank) for single band units.
- Fields 13 ~ 21 are omitted (leave blank) if only one path (unidirectional) is required.
- Fields 22 ~ 24 could be omitted (leave blank) if default configurations –K00, -J00, -U00 are chosen.
- Fields 25 ~ 27 are omitted (leave blank) if default configuration -000 is chosen.
- Field 27 - Special options, contact Canam. This field could be omitted if the value is 0 (zero).

(\*) Compliant with NFPA72 (2019), NFPA1221 (2019), NFPA5000 (2018) and IFC (2018) editions.

**FCC Part 90 Signal Boosters THIS IS A 90.219 CLASS B DEVICE**

**TCJ-M4BBDAV, TCJ-M4BBDAU, TCJ-M4BBDA8**

**WARNING.** This is NOT a CONSUMER device. It is designed for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express consent of an FCC License to operate this device. You MUST register Class B signal boosters (as defined in 47 CFR 90.219) online at [www.fcc.gov/signal-boosters/registration](http://www.fcc.gov/signal-boosters/registration). Unauthorized use may result in significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation."

(3) PLEASE CONTACT CANAM WITH YOUR CUSTOM REQUIREMENTS.