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MAXNET[®]

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D3.1/CCAP[™]
Compliant

QMN Amplifier

INSTALLATION & OPERATION MANUAL

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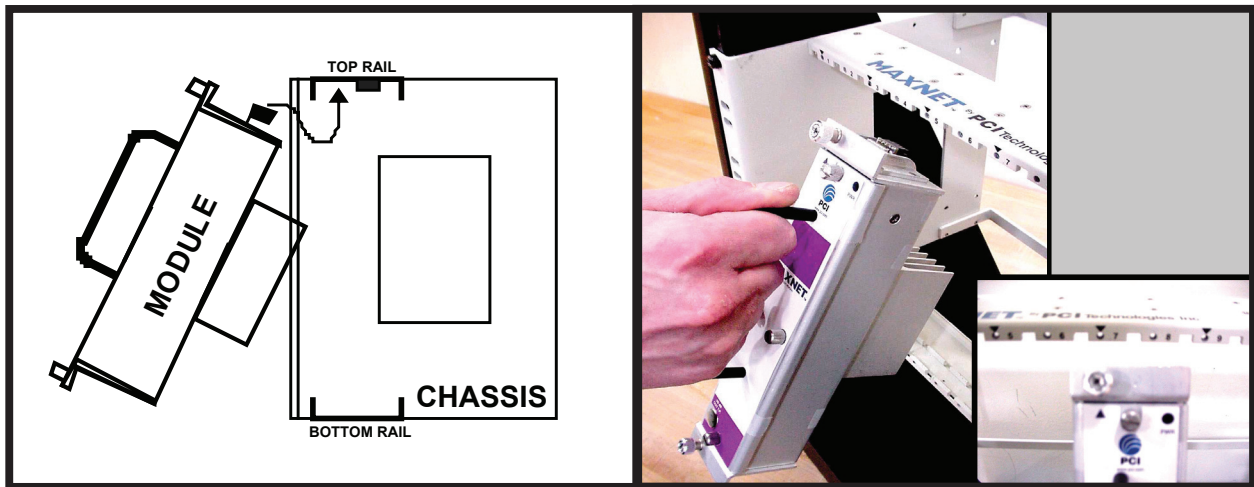
INSTALLATION INSTRUCTIONS

1. Installation Instructions

Install the MAXNET QMN Amplifier into a MAXNET MN5BA Chassis with at least one MNAC or MNDC power supply installed using the following procedure. The Front Panel LED on the MAXNET QMN amplifier should light Green. You will require a spectrum analyzer or Signal Level meter to monitor the Test points during the Set-up procedure.

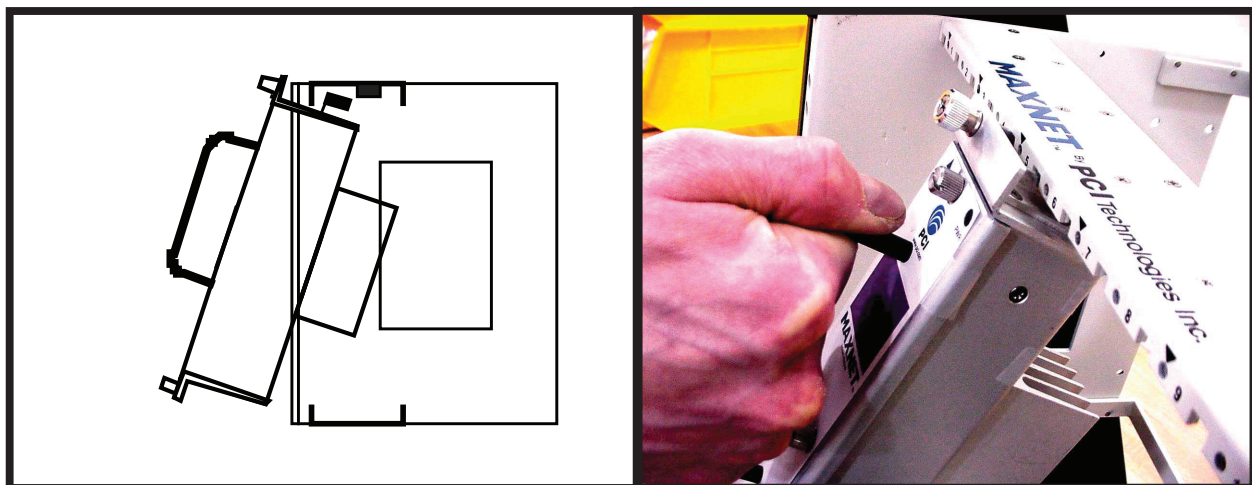
1.1 Step 1

Approach chassis with a module on a forward angle. Make sure the captive screw on module lines up with a black triangle on top rail (slot 1, 3, 5, 7, 9, 11, 13, 15, or 17).



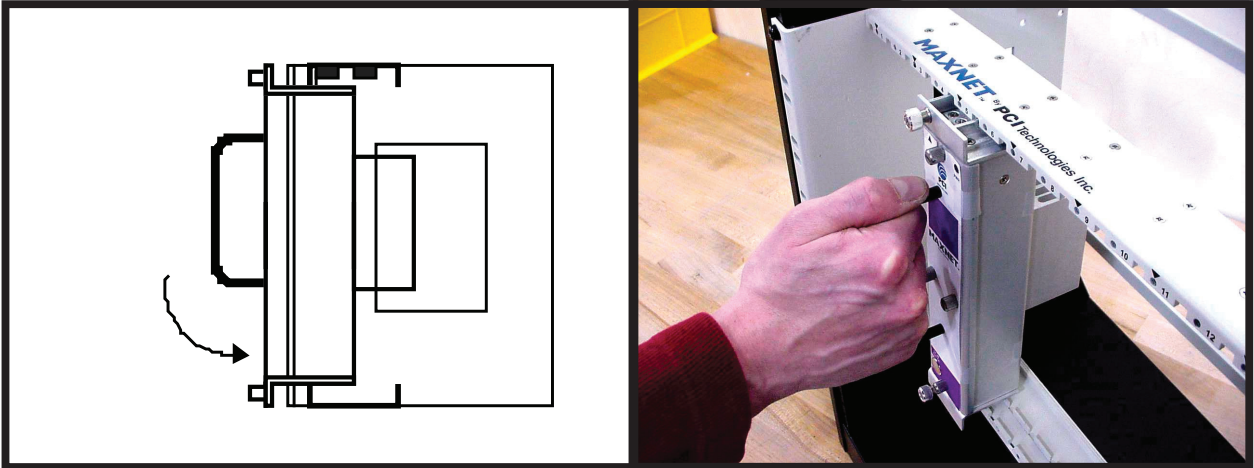
1.2 Step 2

Hook connector (located on top of amp module) under the top rail flange.



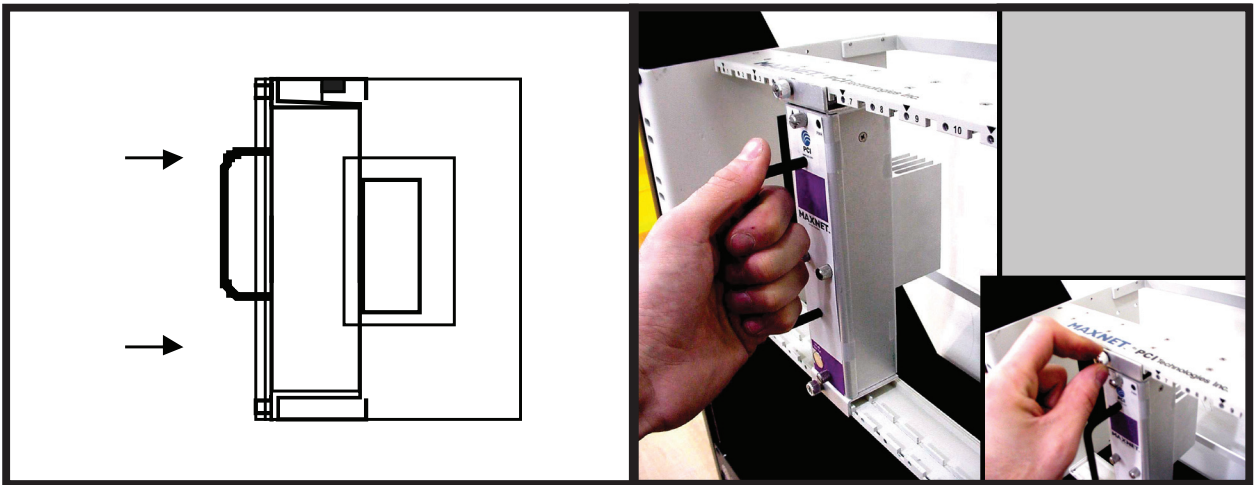
1.3 Step 3

Straighten the module by bringing the bottom of the module in until perpendicular.



1.4 Step 4

Apply forward pressure until module connects flush to chassis rails. Then tighten captive module screws into chassis.



When removing module, follow instructions in reverse order.

IMPORTANT: Disconnect connector in top rail first before pulling on bottom of module so as not to damage the connector.

1. Connect your system input, via coaxial cable, to the RF IN port on the QMN Amplifier.
2. Connect the amplifier RF OUT port to your downstream equipment.

1.5 Select an Input EQ (QMN Only, Not on QMN2)

While monitoring the -20 dB RF Input Test Point, measure the incoming signals and select a QAE860 Equalizer that will provide a flat signal to the input hybrid of the amplifier. Install this EQ in the Input EQ location by loosening four thumbscrews

on the MAXNET QMN Amplifier front cover and removing the cover completely. The EQ's available are from 1.5 to 21 dB in 1.5 dB increments.

1.6 Select an Input Pad

To maintain good Carrier to Noise, the rule of thumb states that the minimum input Level to the first hybrid should be 3 dB above the Noise Figure of the amplifier. The maximum level is calculated by subtracting the Gain of the amplifier from the recommended output level per the table on the next page.

PART NUMBER <small>(Notes 1, 8, & 9)</small>	FWD. GAIN SPEC.				RESP. CONT.		INJECT. PORT		I/O T.P.		I/O RL <small>(Note 5)</small> (dB)	CURRENT <small>(Note 6)</small> (mA)	DISTORTIONS				NOISE FIGURE (dB)	AMP TECH <small>(Note 7)</small>
	BW (MHz)	Gain ⁽²⁾ (dB)	Slope ⁽³⁾ (dB)	Flat. (±dB)	Gain Cont. Pad	Slope Cont. EQ	IL (16.0±dB)	ISO ⁽⁴⁾ (dB)	IL (20.0±dB)	Output Level (dBmV)			Ch. Load # ⁽¹⁰⁾ (dB)	Ch. Slope (dB)	CTB (-dB)	CSO (-dB)		
											Plug-in							
QMN870-18GP/**	40-870	18	-0/+1.5	.5	Pad	EQ	.5	≥ 50	1	16	420	43	79	0	76	74	< 5.0	PD GaAs
QMN870-22GP/**	40-870	22	-0/+1.5	.75	Pad	EQ	.5	≥ 50	1	16	420	43	79	0	74	74	< 5.0	PD GaAs
QMN870-25GP/**	40-870	25	-0/+1.5	.75	Pad	EQ	.5	≥ 50	1	16	420	43	79	0	74	72	< 5.0	PD GaAs
QMN1000-18GP/**	40-1000	18	-0/+2	.5	Pad	EQ	.75	≥ 45	1	14.5	420	43	79	0	76	74	< 5.0	PD GaAs
QMN1000-22GP/**	40-1000	22	-0/+2	.75	Pad	EQ	.75	≥ 45	1	14.5	420	43	79	0	74	74	< 5.0	PD GaAs
QMN1000-25GP/**	40-1000	25	-0/+2	.75	Pad	EQ	.75	≥ 45	1	14.5	420	43	79	0	74	72	< 5.0	PD GaAs

NOTES:

- (1) ** Details: 1st* = F for F connectors or B for BNC connectors; 2nd* = replace with I for Post gain stage -16 dB output insertion point.
All units supplied with -20 dB F connector front input & output test point.
 - (2) Gain at 50 MHz.
 - (3) Gain at highest specified frequency.
 - (4) From injection port to RF input port with RF output port terminated into 75 ohm load.
 - (5) Worst case return loss for input and output ports.
 - (6) DC load current at +24 VDC.
 - (7) PP = Push-Pull; PD = Power-Doubled; Si = Silicon; GaAs = Gallium Arsenide.
 - (8) F connector mating center conductor diameter: .025" - .042".
 - (9) All specifications listed include 20 dB output test point. Assume worst case of 1 dB increased insertion loss if input test point is required.
 - (10) 79 CW NTSC analog channels from 54-550 MHz with 320 MHz QAM loading 6 dB below analog carrier levels.
- Operating temperature: 0°C to +50°C (+32°F to +122°F)
Humidity: 5-95% (without condensation)
Dimensions: 8.66"H x 1.82"W x 6.0"D (21.99H x 4.62W x 15.24D cm)
Weight: 1.9 lbs (0.96 kgs)

PART NUMBER <small>(Notes 1 and 5)</small>	FWD. GAIN SPEC.				RESP. CONT.		I/O T.P.		I/O RL <small>(Note 2)</small> (dB)	CUR. <small>(Note 3)</small> (mA)	DISTORTIONS				NOISE FIGURE (dB)	AMP TECH <small>(Note 4)</small>
	BW (MHz)	Gain (dB)	Flat. (±dB)	Gain Cont. (-dB)	Slope Cont. (-dB)	IL (20.0±dB)	IL (20.0±dB)	Output Level (dBmV)			Ch. Load # ⁽⁶⁾ (dB)	Ch. Slope (dB)	CTB (-dB)	CSO (-dB)		
QMN2870-30GP/*	40-870	30	.5	8	8	0.8	17	665	43	79	0	76	74	5	PD GaAs	
QMN2870-34GP/*	40-870	34	.5	8	8	0.8	17	670	43	79	0	76	73.5	4.5	PD GaAs	
QMN21000-30GP/*	40-1002	30	.7	8	8	1	15	665	43	79	0	76	74	5.3	PD GaAs	
QMN21000-34GP/*	40-1002	34	.7	8	8	1	15	670	43	79	0	76	74	4.8	PD GaAs	
QMN2F1000-30GP/F	40-1002	30	.7	JXP	JXP	1	15	665	43	79	0	76	74	5.3	PD GaAs	
QMN2F1000-34GP/F	40-1002	30	.7	JXP	JXP	1	15	665	43	79	0	76	74	5.3	PD GaAs	

NOTES:

- A maximum of five forward dual hybrid amplifiers can be used in one active chassis, if it is powered with MNAC-110, MNAC-220, or MNDC power supplies.
 - (1) * = F for F connectors or B for BNC connectors. Note: All front test points are F connectors.
 - (2) Worst case return loss for input and output ports.
 - (3) DC load current (worst case) at +24 VDC.
 - (4) PP = Push-Pull; PD = Power-Doubled; Si = Silicon; GaAs = Gallium Arsenide.
 - (5) F connector mating center conductor diameter: .025" - .042".
 - (6) 79 CW NTSC analog channels from 54-550 MHz with 320 MHz QAM loading 6 dB below analog carrier levels.
- Operating temperature: 0°C to +50°C (+32°F to +122°F)
Humidity: 5-95% (without condensation)
Dimensions: 8.66"H x 1.82"W x 6.0"D (21.99H x 4.62W x 15.24D cm)
Weight: 1.9 lbs (0.96 kgs)

Monitor the 20 dB RF Input Test Point and install an MNPAD of the appropriate value to attenuate the RF input to the amplifier to within this level. The Pad's that are available are in values from 1 to 20 dB in 1 dB increments.

(Using The QMN870-18GP Amplifier as an example, the noise figure is 4 dB so the minimum input should be about 10 dBmV. The maximum input level is calculated by subtracting the Gain of the amplifier from the recommended output level. Conversely, the maximum input level is 20 dBmV, which is calculated by subtracting the recommended output level of 38 dBmV from the Gain of 18 dB. Install an input MNPAD of the appropriate value to attenuate the RF input to the amplifier to this level range).

1.7 Setting the RF Output Slope

If you require to run a slope on the amplifier's RF output, monitor the RF output of the amplifier at the -20 dB RF Output Test point on the Front Panel of the QMN Amplifier.

In the case of the QMN2 dual hybrid amplifier, adjust the Front Panel SLOPE control to attain the proper system slope. In the case of the QMN single hybrid amplifier, install a value of QAE860 interstage EQ that will produce the proper system slope.

1.8 Setting the RF Output Level

Monitor the RF output of the amplifier at the –20 dB RF Output Test point on the Front Panel of the QMN Amplifier.

In the case of the QMN2 dual hybrid amplifier, adjust the Front Panel GAIN control to attain the proper system output level. In the case of the QMN single hybrid amplifier, install a value of MNPAD output PAD that will produce the proper system output level.

Operating above or below the Rated Output Level

The amplifier can be run at higher output level at the cost of distortion performance and can also be run at a lower output level at the cost of carrier to noise performance.

The Amplifier performance is impacted by the following relationships to output level:

If you wish, you can increase the RF input level, and therefore increase the RF output level beyond the nominal to increase the carrier to noise ratio (CNR). A 1 dB increase in input level will increase your CNR by 1 dB. Consequentially your Carrier-Composite-Second Order (CSO) distortions will increase by 1 dB and your Carrier-Composite-Triple Beat (CTB) distortions will increase by 2 dB, therefore worsening the distortion performance.

If you wish, you can decrease the RF input level, and therefore decrease the RF output level beyond the nominal to improve your distortion performance, at the detriment of your CNR. Similar to the above relationship to RF output level, a 1 dB decrease in RF input level will decrease your CNR by 1 dB and decrease your link CSO by 1 dB and decrease your link CTB by 2 dB, therefore improving your distortion performance.

Here are the Specifications for the QMN Single hybrid and QMN2 Dual hybrid amplifiers and their rated specifications for CTB and CSO.

Replace the Front cover on the amplifier and tighten the four thumbscrews to maintain the shielding effectiveness of the amplifier.

SERVICE & SUPPORT

2. Service & Support

2.1 Contact ATX Networks

Please contact ATX Technical Support for assistance with any ATX products. Please contact ATX to obtain a valid RMA number for any ATX products that require service and are in or out-of-warranty before returning a failed module to ATX.

TECHNICAL SUPPORT

Tel: 289.204.7800 – press 1
Toll-Free: 866.YOUR.ATX (866.968.7289) USA & Canada only
Email: support@atx.com

SALES ASSISTANCE

Tel: 289.204.7800 – press 2
Toll-Free: 866.YOUR.ATX (866.968.7289) USA & Canada only
Email: insidesales@atx.com

FOR HELP WITH AN EXISTING ORDER

Tel: 289.204.7800 – press 3
Toll-Free: 866.YOUR.ATX (866.968.7289) USA & Canada only
Email: orders@atx.com
Web: www.atx.com

2.2 Warranty Information

All of ATX Networks' products have a 1-year warranty that covers manufacturer's defects or failures.



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