

Алматы (7273)495-231
 Ангарск (3955)60-70-56
 Архангельск (8182)63-90-72
 Астрахань (8512)99-46-04
 Барнаул (3852)73-04-60
 Белгород (4722)40-23-64
 Благовещенск (4162)22-76-07
 Брянск (4832)59-03-52
 Владивосток (423)249-28-31
 Владикавказ (8672)28-90-48
 Владимир (4922)49-43-18
 Волгоград (844)278-03-48
 Вологда (8172)26-41-59
 Воронеж (473)204-51-73
 Екатеринбург (343)384-55-89
 Иваново (4932)77-34-06

Ижевск (3412)26-03-58
 Иркутск (395)279-98-46
 Казань (843)206-01-48
 Калининград (4012)72-03-81
 Калуга (4842)92-23-67
 Кемерово (3842)65-04-62
 Киров (8332)68-02-04
 Коломна (4966)23-41-49
 Кострома (4942)77-07-48
 Краснодар (861)203-40-90
 Красноярск (391)204-63-61
 Курган (3522)50-90-47
 Курск (4712)77-13-04
 Липецк (4742)52-20-81
 Магнитогорск (3519)55-03-13

Россия +7(495)268-04-70

Москва (495)268-04-70
 Мурманск (8152)59-64-93
 Набережные Челны (8552)20-53-41
 Нижний Новгород (831)429-08-12
 Новокузнецк (3843)20-46-81
 Новосибирск (383)227-86-73
 Ноябрьск (3496)41-32-12
 Омск (3812)21-46-40
 Орел (4862)44-53-42
 Оренбург (3532)37-68-04
 Пенза (8412)22-31-16
 Пермь (342)205-81-47
 Петрозаводск (8142)55-98-37
 Псков (8112)59-10-37

Казахстан +7(7172)727-132

Ростов-на-Дону (863)308-18-15
 Рязань (4912)46-61-64
 Самара (846)206-03-16
 Санкт-Петербург (812)309-46-40
 Саранск (8342)22-96-24
 Саратов (845)249-38-78
 Севастополь (8692)22-31-93
 Симферополь (3652)67-13-56
 Смоленск (4812)29-41-54
 Сочи (862)225-72-31
 Ставрополь (8652)20-65-13
 Сургут (3462)77-98-35
 Сыктывкар (8212)25-95-17
 Тамбов (4752)50-40-97

Киргизия +996(312)96-26-47

Тверь (4822)63-31-35
 Тольятти (8482)63-91-07
 Томск (3822)98-41-53
 Тула (4872)33-79-87
 Тюмень (3452)66-21-18
 Улан-Удэ (3012)59-97-51
 Ульяновск (8422)24-23-59
 Уфа (347)229-48-12
 Хабаровск (4212)92-98-04
 Чебоксары (8352)28-53-07
 Челябинск (351)202-03-61
 Череповец (8202)49-02-64
 Чита (3022)38-34-83
 Якутск (4112)23-90-97
 Ярославль (4852)69-52-93

akm@nt-rt.ru || <https://ametek.nt-rt.ru/>

LPA50/LPA100, LPA-2



50/100W LINEAR POWER AMPLIFIER

FOR POWER LINE CARRIER COMMUNICATIONS

The LPA-2 is the next generation high-power amplifier for Power Line Carrier Communications and adds features and efficiency superior to all previous designs using latest technology. It offers flexibility plus user-friendliness on its input and output such that it can be used with any power line carrier system. Two 50W units can be combined for a 100W output and to provide redundancy.

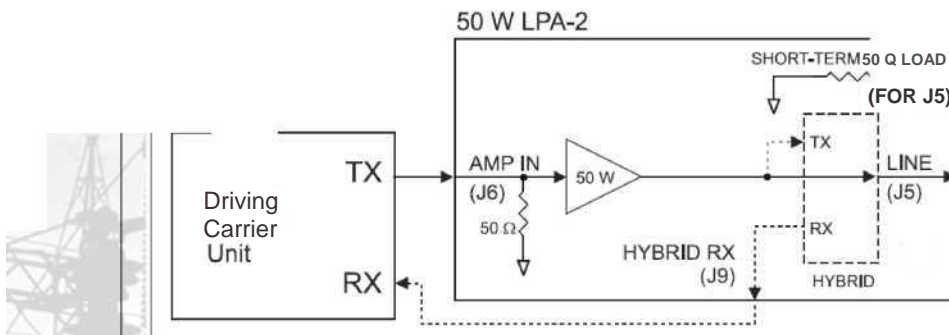
Although primarily used in applications where the attenuation from end-to-end is higher than the normal 10W amplifier can handle or where the line noise is high, the LPA-2 can also be used in normal applications to boost system dependability by significantly improving the possibility of the PLC signal not being lost during a high noise event.

Modern design makes the LPA-2 able to protect itself against shorts or open circuits on its coax cable output as well as against being overdriven on its input. Once any problem is removed it will automatically recover without damage to the unit.



FEATURES AND BENEFITS

- Space saving 2-RU 50W design/4-RU 100W design (no fans)
- Improved efficiency for lower heat
- Automatic overload protection/reliable robust design
- Self-monitoring plus convenient front LED status, adjustor, and test points
- Optional built-in skewed hybrid
- Standard 50Q short-term 100W load built-in for testing



Typical connection diagram of one terminal of a PLC system with a 50W LPA-2 inserted to boost the transmit power & the internal 50 Q load temporarily connected to its Line Output for setting the TX power level. (Optional Hybrid shown in dotted lines.)

1.1 General Description

Linear Power Amplifier (LPA) comes in two versions:

- 1) The LPA50 (with a 50 W output)
- 2) The LPA100 (with a 100 W output)

Both are class A amplifiers that put out their rated power of 50 and 100 watts continuously over a frequency range of 30–535 kHz. Both units are designed for inserting between an existing carrier set and the line tuner to boost the normal power output of the carrier system.

1.2 Standard Nomenclature

The standard nomenclature linear power amplifier equipment is as follows:

Cabinet – contains fixed-racks, swing-racks, or open racks

Rack – contains one or more chassis (e.g., the LPA–100)

Chassis – contains several printed circuit boards, called modules (e.g., Power Supply or Power Amplifier)

Module – contains a number of functional circuits

Circuit – a complete function on a printed circuit board

1.3 LPA50/LPA100 Chassis

As explained in the “LPA50/LPA100 Configurations” section later, there are two possible chassis configurations for the linear power amplifier. All chassis have the following standard dimensions:

Height – 5.25” (133.35 mm), requiring 3 rack units, each measuring 1.75” (44.45 mm)

Width – 19.00” (482.6 mm)

Depth – 13.50” (342.9 mm)

This is the same size chassis used TC-10B/TCF-10B carrier sets. Each chassis is notched for mounting in a standard relay rack.

1.4 LPA50/LPA100 Modules

The LPA50 functional block diagram is shown in Figure 1-2; the LPA100 circuitry is shown in the functional block diagrams in Figure 1-3 (for chassis 1 of 2) and Figure 1-4 (for chassis 2 of 2). Circuit descriptions, complete with schematic diagrams and parts lists for each module, are shown in Chapters 7 through 10, along with sub numbers indicating the current revisions for each module, as follows:

Chapter Module Schematic Parts List

7. Power Supply 1617C38-2 1617C38-2
8. 12.5W Power Amplifier 1606C33-21 1606C33-21
9. 50W Combiner CA30-CMBMN* CA40-CMBMN*
10. 100W Combiner CA30-CMBMN* CA40-CMBMN*

* Differences for each module are noted on document.

1.5 LPA50/LPA100 Configurations

The PULSAR Linear Power Amplifier (LPA) comes in two configurations:

- 1) The LPA50 (one chassis with a 50 W output)
- 2) The LPA100 (two chassis with a combined 100 W output)

1.5.1 LPA50 Configuration

The LPA50 comprises one chassis assembly and the following:

- Power Supply Module (2)
- 12.5W Power Amplifier Module (4)
- 50W Combiner Module (1)

The modular layout for the LPA50 chassis is shown in Figure 1-1. At each end of the chassis is a Power Supply Module and two 12.5W Power Amplifier Modules. Each Power Supply Module powers the two 12.5W Power Amplifier Modules closest to it. This gives a measure of redundancy such that if you lose one Power Supply Module, the remaining Power Supply Module will still power the other two 12.5W Power Amplifier Modules. The Power Combiner Module is in the center of the chassis. It combines the output from the four Power Amplifier Modules into a single 50 watt output.

The 50W Power Combiner Module is completely passive and thus requires no power. It requires equal amplitude and in-phase carrier frequency signals for minimum loss in the combiner circuit. Whatever difference there is between the two signals being combined is dissipated as heat in the high wattage resistors on this module. In normal operation all of the 12.5W Power Amplifier Modules are putting out equal amplitude and in-phase signals, and there is almost zero loss in the combiner circuit.

1.5.2 LPA100 Configuration

The LPA100 comprises two chassis assemblies and the following:

- Power Supply Module (2 in each chassis for a total of 4)
- 12.5W Power Amplifier Module (4 in each chassis for a total of 8)
- 50W Combiner Module (1 in each chassis for a total of 2)
- 100W Combiner Module (1)
- Interconnecting cables (1 lot)

SPECIFICATIONS

Specification LPA-2	Value
Frequency Bandwidth	30 kHz-535 kHz
Input Impedance	Settable 50 Q (normal setting) or 5k Q
Output Impedance	50 Q
Maximum RF Power Input	10 W (+40 dBm or 22.4 V, 50 Q reference)
Recommended RF Power Input	5 W (+37 dBm or 15.8 V, 50 Q reference)
Minimum RF Power Input (to get 50 W output)	2 W (+33 dBm or 10 V, 50 Q reference)
Maximum Power Output	50 W continuous single frequency into 50 Q load (+47 dBm or 50 V, 50 Q reference) *
Harmonic & Spurious Noise Output	50 dB below 50 W fundamental *
Standard Compliance	Meets relevant specifications: IEEE C93.5 & IEEE 1613
Alarm Relay Contact Rating	15 ms max operate time, 1 A max make/carry, 0.25 A max interrupt at 250 Vdc
50Q Dummy Load (Testing & Setup)	80 W Continuous, 100 W for 2 Minute
Ambient Temperature Range	-20 to 60° C

LPA50 Technical Specifications.

Frequency Bandwidth 30 kHz–535 kHz
Input impedance 50Ω with all four 12.5W Power Amplifiers plugged in
Output impedance 50Ω with all four 12.5W Power Amplifiers plugged in
Maximum power input 10 W (+40 dBm, 50 Ω reference)
Minimum power input 10 mW (+10 dBm, 50 Ω reference) **(to get 50 W output)**
Maximum power output 50 W continuous single frequency (+47 dBm, 50Ω reference)
Harmonic & spurious output 55 dB below 50 W
Overall power loss for failure of the 12.5W Power Amplifier(s):
One 12.5W Power Amplifier failure -2.9dB
Two 12.5W Power Amplifier failures -6.4 dB
Three 12.5W Power Amplifier failures -12.8 dB

LPA100 Technical Specifications.

Frequency Bandwidth 30 kHz–535 kHz
Input impedance 25Ω with all eight 12.5W Power Amplifiers plugged in
Output impedance 50Ω with all eight 12.5W Power Amplifiers plugged in
Maximum power input 10 W (+40 dBm, 50Ω reference)
Minimum power input 10 mW (+10 dBm, 50Ω reference) **(to get 100 W output)**
Maximum power output 100 W continuous single frequency (+47 dBm, 50Ω reference)
Harmonic & spurious output 55 dB below 100 W
Overall power loss for failure of the 12.5W Power Amplifier(s):
One 12.5W Power Amplifier failure -1.1 dB
Two 12.5W Power Amplifier failures -2.5 dB
Three 12.5W Power Amplifier failures -4.1 dB
Four 12.5W Power Amplifier failures -6.0 dB
Five 12.5W Power Amplifier failures -8.5 dB
Six 12.5W Power Amplifier failures -12.0 dB
Seven 12.5W Power Amplifier failures -18.0 dB

AMETEK

POWER INSTRUMENTS

Алматы (7273)495-231
 Ангарск (3955)60-70-56
 Архангельск (8182)63-90-72
 Астрахань (8512)99-46-04
 Барнаул (3852)73-04-60
 Белгород (4722)40-23-64
 Благовещенск (4162)22-76-07
 Брянск (4832)59-03-52
 Владивосток (423)249-28-31
 Владикавказ (8672)28-90-48
 Владимир (4922)49-43-18
 Волгоград (844)278-03-48
 Вологда (8172)26-41-59
 Воронеж (473)204-51-73
 Екатеринбург (343)384-55-89
 Иваново (4932)77-34-06

Ижевск (3412)26-03-58
 Иркутск (395)279-98-46
 Казань (843)206-01-48
 Калининград (4012)72-03-81
 Калуга (4842)92-23-67
 Кемерово (3842)65-04-62
 Киров (8332)68-02-04
 Коломна (4966)23-41-49
 Кострома (4942)77-07-48
 Краснодар (861)203-40-90
 Красноярск (391)204-63-61
 Курган (3522)50-90-47
 Курск (4712)77-13-04
 Липецк (4742)52-20-81
 Магнитогорск (3519)55-03-13

Россия +7(495)268-04-70

Москва (495)268-04-70
 Мурманск (8152)59-64-93
 Набережные Челны (8552)20-53-41
 Нижний Новгород (831)429-08-12
 Новокузнецк (3843)20-46-81
 Новосибирск (383)227-86-73
 Ноябрьск (3496)41-32-12
 Омск (3812)21-46-40
 Орел (4862)44-53-42
 Оренбург (3532)37-68-04
 Пенза (8412)22-31-16
 Пермь (342)205-81-47
 Петрозаводск (8142)55-98-37
 Псков (8112)59-10-37

Казахстан +7(7172)727-132

Ростов-на-Дону (863)308-18-15
 Рязань (4912)46-61-64
 Самара (846)206-03-16
 Санкт-Петербург (812)309-46-40
 Саранск (8342)22-96-24
 Саратов (845)249-38-78
 Севастополь (8692)22-31-93
 Симферополь (3652)67-13-56
 Смоленск (4812)29-41-54
 Сочи (862)225-72-31
 Ставрополь (8652)20-65-13
 Сургут (3462)77-98-35
 Сыктывкар (8212)25-95-17
 Тамбов (4752)50-40-97

Киргизия +996(312)96-26-47

Тверь (4822)63-31-35
 Тольятти (8482)63-91-07
 Томск (3822)98-41-53
 Тула (4872)33-79-87
 Тюмень (3452)66-21-18
 Улан-Удэ (3012)59-97-51
 Ульяновск (8422)24-23-59
 Уфа (347)229-48-12
 Хабаровск (4212)92-98-04
 Чебоксары (8352)28-53-07
 Челябинск (351)202-03-61
 Череповец (8202)49-02-64
 Чита (3022)38-34-83
 Якутск (4112)23-90-97
 Ярославль (4852)69-52-93