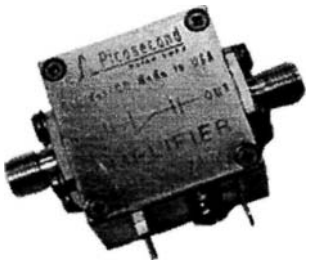
Picosecond Pulse Labs

MODEL 5828A
ULTRA-BROADBAND AMPLIFIER
PRODUCT SPECIFICATION

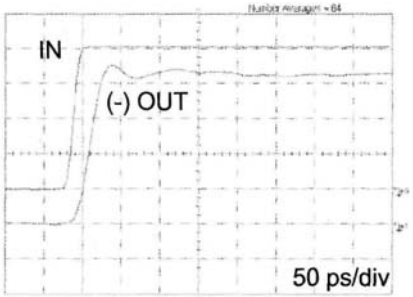
- **10 dB Gain**
- **23 ps Risetime**
- **14 GHz Bandwidth**
- **+12dBm Output**
- **6.0 dB Noise Figure**



This Ultra-Broadband Amplifier is an excellent choice for either pulse or RF applications. It offers a very attractive price/performance ratio. It is AC coupled and is extremely broadband, covering 5 1/2 decades from 50 kHz to 14 GHz. It has clean transient response and smooth gain vs. frequency response. This is a stable 50 Ω amplifier, and several can be connected in cascade for higher gains. The Model 5828A is ideal for 10 Gb/s systems.

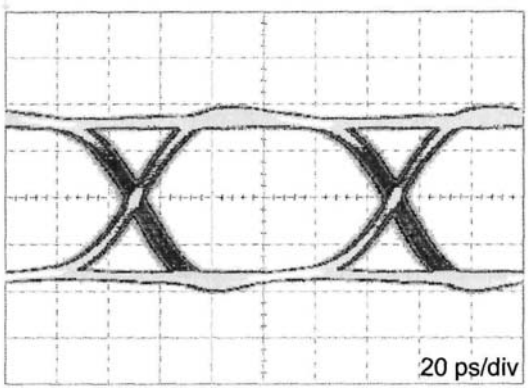
Time Domain Pulse Response

Input is 15 ps Risetime Step
Measured with a PSPL Model 4015C, 15 ps Pulse Generator and an Agilent, 50 GHz digital sampling oscilloscope



Eye Diagram
10 Gb/s

Measured with an Advantest D3186 Pattern Generator and Agilent 40 GHz sampling oscilloscope
PRBS = 2^{23}-1



Ordering Information

Model Number	Description
5828A-107	SMA jack (f) - jack (f), solder pin on DC
5828A-108	SMA jack (f) - jack (f), solder pin on DC, mounting plate option

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Picosecond Pulse Labs

PRODUCT SPECIFICATION MODEL 5828A AMPLIFIER

Specifications

Gain, S_{21} (100 MHz) min limit	10.6 dB 9 dB min.	
Polarity	Inverting	
Bandwidth (-3 dB) **[3]** min limit	14.4 GHz 12 GHz min.	
Gain Flatness [3]	±0.5dB f<4 GHz	
Low Frequency (-3 dB)	50 kHz	
Risetime (10%-90%) **[4]** max. limit	23 ps 30 ps max.	
Overshoot [4] max limit	5% 8% max.	
Max Power Out (-1 dB gain comp)	+12 dBm (100MHz) +14 dBm (5 GHz) +11 dBm (10 GHz)	
Noise Figure (100 MHz) max limit typical NF vs. frequency	6.0 dB 8 dB max. 6.7 dB (5 GHz) 7.5 dB (10 GHz)	
Effective Input RMS Noise Voltage	112 µV rms	
TDR Refl. Input output	+25% -10%	
Max. RF In (cw) or peak pulse	+10 dBm 1 V	
Return Loss S_{11} input (100 MHz) S_{22} output	15 dB 18 dB	
Isolation S_{12} (100 MHz)	19dB	
DC Current	53 mA	
DC Voltage	12 V DC, ± 0.5 V	
Temperature	-25 C to +75 C case temperature operating, -25 C to +90 C storage	
Temp Coeff - Gain	-0.002 dB/C	
Temp Coeff - **BW**	-0.16%/C	
Connectors	RF in and out = SMA jacks (f), DC in = solder pin	
Warranty	Static-sensitive devices. Limited 30-day warranty	

Notes

[1] Parameters listed are typical values. Guaranteed at +12 V and 23 C only when max/min limits are given.
[2] Gain, return loss, isolation, noise figure and max. power output all measured at 100 MHz.
[3] Frequency response measured using a Wiltron 5447A, 10 MHz - 20 GHz network analyzer.
[4] Time domain step responses measured with an Agilent 20 GHz oscilloscope and 25 ps risetime test pulse.
[5] PSPL does 100% QA testing on amplifiers. All amps are stored at -25 C and +90 C and then receive a minimum of 24 hours burn-in. QA tests include gain and noise figure at 100 MHz, S21 frequency response including -3 dB bandwidth, time domain pulse response risetime, overshoot, pulse fidelity and low frequency square wave response. All parameters measured with +12 V DC power at +23 C ambient temperature.
[6] Static sensitive! Avoid static discharges. Do not exceed max. input limits.

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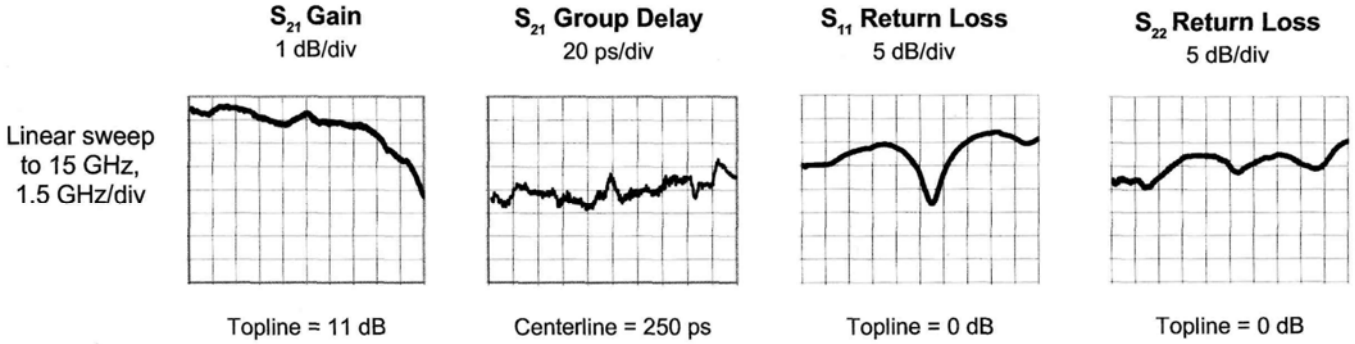
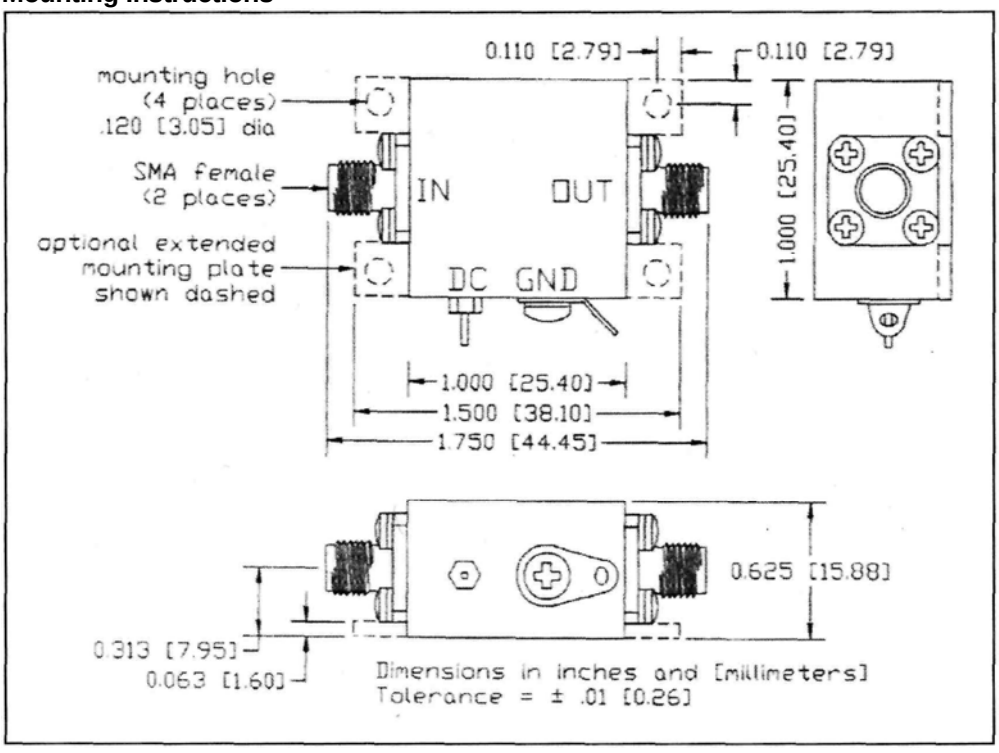


Measured by a Wiltron 37369A vector network analyzer

Mounting Instructions

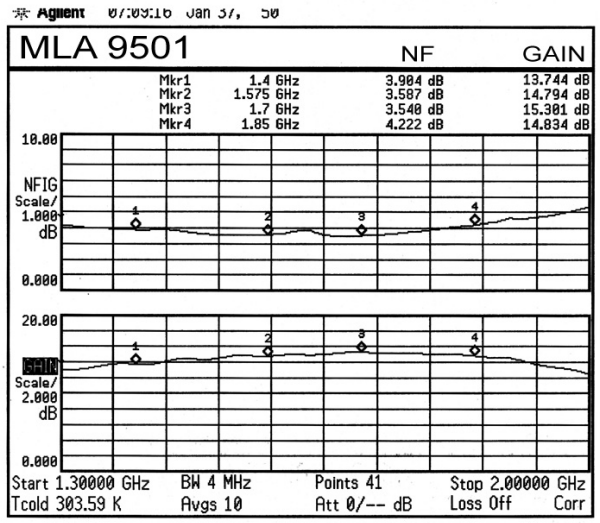


L'AMPLIFICATORE VA MONTATO SU UN PICCOLO DISSIPATORE TERMICO

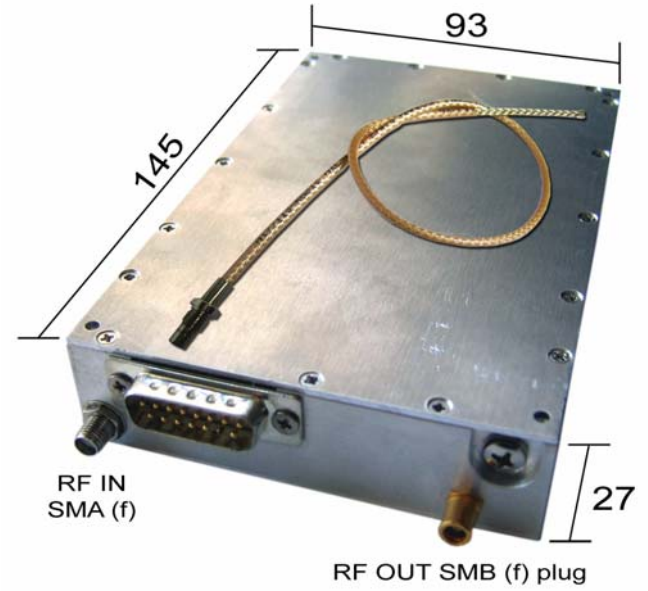
THE AMPLIFIER MUST BE MOUNTED WITH A LITTLE HEAT SINK

The Micom MLA-9501 amplifier covers the band from 1400 to 1900 MHz, it is suitable for medium noise and high dynamic applications, it has the possibility to tune the gain using PIN diodes. The power supply is +12 V with a typical current of 330mA due to high dynamic. The input signal incoming in the SMA female connector is divided by a power splitter connected to the PIN diodes attenuator and it is then recombined on output again by a power splitter. Following the stage of real amplification still made up of an input divider followed by two high dynamic ATF10736 GaAs-FET active devices and it is then recombined on output again by a power splitter, the output signal is on SMB (f) plug connector. As you can see from the configuration of the block diagram (2 stages coupled in parallel) and the low distortion pin diodes, the amplifier is mainly designed for high dynamic applications or as a second stage amplifier. The amplifier is housed in a milled aluminum box with all the connectors on the same side.

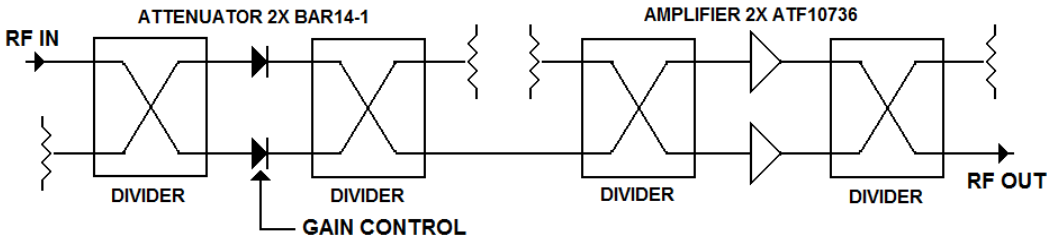
NOTE: in the field of microwave radio links or for professional applications is often used the configuration with two low noise stages in parallel, the aim is clearly to improve the dynamics, the circuit becomes very complicated but with a significant improvement with strong signals, the result is a noise figure almost similar to that of a single stage and a better matching. Note that the same application also includes attenuator stages with pin diodes (always coupled with hybrid combinators), balanced mixers, etc…



typical noise figure and gain
span 1300 - 2000 MHz



the amplifier is provided with SMB jack coaxial cable assembly



block diagram

Specifications

-- Frequency : 1400 - 1900 MHz
-- Gain : 15dB center band , 13dB outer band
-- Noise figure : 3.5 - 4.3 dB
-- P1dB : +17 dBm
-- In Out - Ret Loss : typical 13-20 dB
-- Power supply : +12V 330mA
-- Weight : 420 g

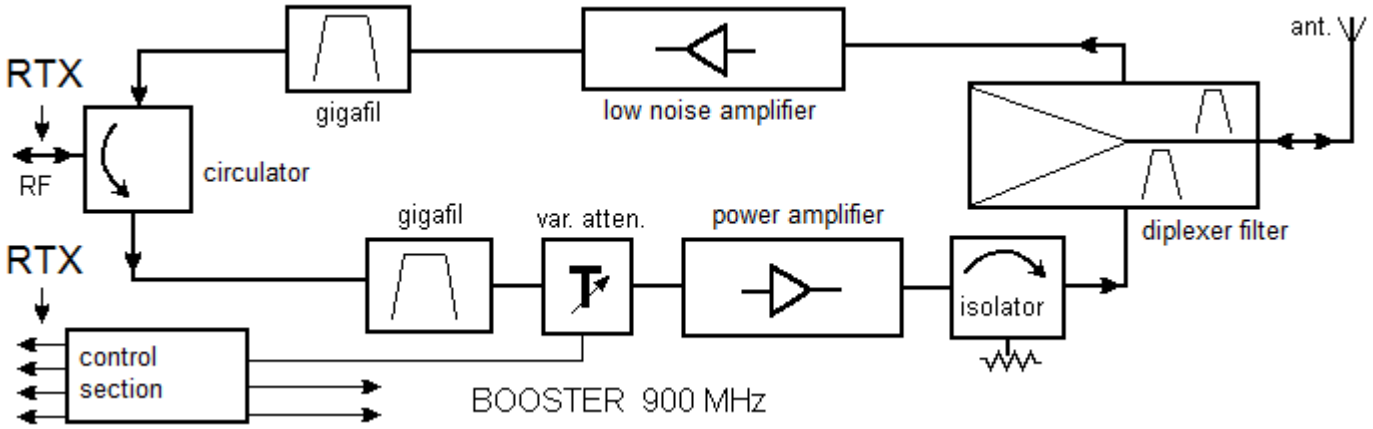
There is a PIN diode gain control by a simple external potentiometer with a range from +15 to about +5 dBG in the center band and from +13 to about +4 dBG in the outer band.

cod. MLA-9501

price and availability on request

900 MHz CELL PHONE BOOSTER CR-BST 2100-I

It is manufactured by Hitachi for mobile radio, it covers the 900 MHz ETACS band with full-duplex. It is provided in its original box new and with all accessories: power supply cable, TNC RF cable, multicore control cable, brackets, etc.. It was used to increase the power of the mobile up to 4W and improve the reception on the 900 MHz ETACS network.
Thanks to its low price it can be used to recover its valuable RF components or to modify it. Inside there are high quality Murata duplexer filter, two circulators, 7W RF power module, two gigafils and a low noise receiver preamplifier, plus the control logic and a sleek metal housing with mounting brackets.



Block diagram of the original fuction as ETACS amplifier

For cordless applications, modification or recovery of components, it is available the datasheet of the power module and the complete electrical diagram. Gigafil are available on different frequencies and mini-duplexer on cordless frequency.
The final module needs only 1 mW to reach the maximum power (high gain).

cod. CR-BST 2100 **special offer € 38,00**

850 - 980 MHz POWER AMPLIFIER MODULE

This module is contained in a metal box with very thick aluminum base for cooling, it has to be mounted on an adequate heat sink for continuous duty cicle.
Its components are in SMD newly built and RF connectors are SMA female and it already includes all the bias network.
It has a high-gain Motorola MHW914 hybrid module that outputs 10W with only 2 -10 mW, the bandwidth is from 850 to 980 MHz and dimensions are 140x92x52 mm. It is suitable to amplify the signal of cameras, alarms, private radio links, mobile phones, cordless phones, etc… it is supplied ready and pre-calibrated, the power supply is 13V 3A, it has to be mounted on an adequate heat sink (not supplied).

availability and price on request

50 W 1,8 GHz (2,4 GHz) POWER AMPLIFIER

This amplifier is for 1900 MHz base stations, it is a Siemens product built in 1999 - 2000 so recently manufactured. This is a plate of 27 x 30 cm divided into two distinct parts:
-- The modulation, oscillator, mixer, up-converter, etc.. + VNA25 TX predriver with 100 mW output power
-- The power final part consists of a 10 W driver module (missing) that drives the final 50 W transistor mounted on a heat-sink and separated from the low power.

The transistor driver is a Motorola module (missing) adapted to 1900 MHz with 10 W output and 50 - 100 mW input, the power supply is 26 V linear class.

The final power transistor is bipolar specified for 60 W at 1.9 GHz at 26 V, on the request are available some suggestion to modify it to reach 2300 MHz with about 50 W if driven with 5 - 7 W.
As it works in lineas class it can be driven with less power while maintaining the same power gain.

It can have many applications: on mobile frequencies for the testing of components for base stations, electromagnetic compatibility, 2.3 GHz amateur frequency band, with good results about 50 W, or down to 1.3 GHz and so on.

The plate is provided with all parts, except the driver module that can be purchased separately (see MHW1815 in power amplifier modules section)

availability and price on request

Optimal frequency Gain	800 - 1050 MHz 24 dB	This amplifier was originally used to amplify the IF signal of the radio links at 23 and 38 GHz. The frequency bandwidth is extended from 800 to 1050 MHz with a maximum gain of about 24 dB. The special feature is a great AGC circuit built with 12 low distortion PIN diodes and a dynamic range of 20 dB specially it was designed to minimize the group delay digital radio links.
Max frequency Gain	700 - 1150 MHz 15 dB	
OIP3 (at G max)	+ 14 dBm	
Input Return Loss	< -10dB	
AGC range Tuning voltage	20 dB Gmax at + 4V - Gmin at 0V	
Noise Figure	5,5 dB	
Power supply	+ 8 V 150 mA - 12 V 25 mA 0 / + 4 V 5 µA AGC	
Size	115 x 70 x 20 mm	
cod.	**IF-1000**	**price on request**

NSG-10A noise generator

This noise generator covers the frequency band from 10 MHz to 10.4 GHz, it is realized according to the scheme and the description already listed in this catalog at the end of the section "A" diodes. As widely described in section “A”, the noise source generator is used for various applications including some of the most important:

-- Reference to measure the noise figure of low noise amplifiers, front-end receiver, mixer, IF amplifiers and so on.
-- Calibrator for spectrum analyzers and reference for radio astronomy receivers.
-- Noise source for RF jammers
-- Signal source for scalar measures for old spectrum analyzers that are without a tracking generator.
-- Special and complex measures such as dithering, fading simulation, NPR, etc...

Usually a noise generator is simple and almost trivial, the main difficulties in build it consist mostly of output linearity (or level flatness) and calibration. The circuit must be made with the utmost care to avoid that one or more components give unwanted resonances thus altering the response of the output signal, with dangerous dips at the self-resonant frequency of some components . The choice of components is very critical when you have to work within 3 decades of bandwidth and also the mechanics must be well cared.
The calibration is also important because each noise generator diode has its own frequency pattern, although with variations of only 1 or 2 dB, each diode must be characterized as the noise figure measure will then need a very precise reference. The diodes are also pre-aged through burn-in and powered for several hours before the final calibration, to ensure a limited aging.

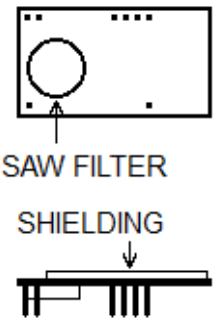
Each noise generator is characterized with Agilent N8975A Noise Figure Meter and Noise Source Series N4000 on the frequencies of 10 and 100 MHz and then from 1 to 10.4 GHz by steps of 1 GHz. The output level about 15 dBENR, the return loss, very important for measurements of NF, is kept low through a connectorised attenuator mounted directly on the noise generator and calibrated together with the generator itself.

Frequency range : 10 MHz - 10,4 GHz
Output level : 15 dBENR ±2 dB
Calibration frequencies : 10 MHz , 100 MHz , 10,4 GHz
from 1 to 10 GHz 1GHz / step
Power supply : +28 Vdc (available on all Noise Figure Meters)
Typical precision : 0,12 dB up to 6 GHz - 0,15 dB up to 10 GHz
Connectors : SMA m for RF output
BNC f for 28Vac power supply

cod. NSG-10A	**390,00 €**

AM RECEIVER FOR 433,920 MHz REMOTE CONTROLS

It 'a small and compact SMD 19 x 41 mm on the 433,920 MHz frequency of and is used in burglar alarms, remote controls and digital and analog audio transmissions.
Even if it is a cheap component nevertheless it has some interesting features: it is equipped with a RF surface-wave SAW filter on the antenna input (this feature is usually available on higher cost types) to improve the immunity to RF interferences, the receiver is also fully shielded against from external electromagnetic fields interferences according to applicable regulations.
The audio output is double, either digital square wave for data and analog for audio.
Features:
Frequency 433,920 MHz Power supply + 5 V 3.2 mA
Operating temperature range -25 +85 ° C Dimensions 19 x 41mm
Output: CMOS square about 3 V pp / 2 KOhm + audio analog signal



	cod. RX-433.92	**price 8,00 € each**