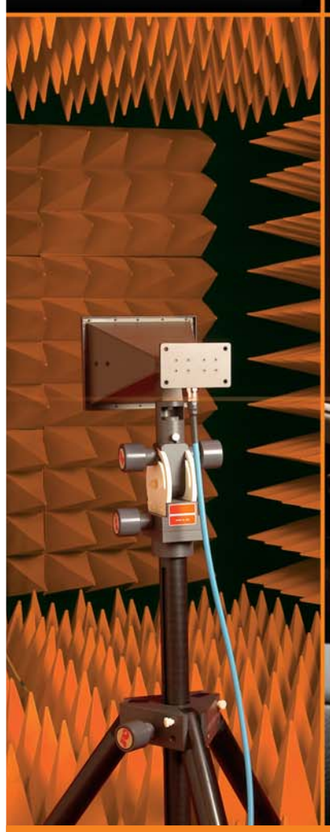
June 2007

Microwave Amplifiers

For EMC and Wireless Testing



"ST" Series. Hybrids.
0.8 to 18 GHz. - 10 to 50 watts.

"T" Series.
0.8 to 45 GHz. - 15 to 16,000 watts.

"S" Series.
0.8 to 20 GHz. - 1 to 800 watts.

When you buy a new S4G8 or S4G11,
we'll upgrade your S1G3 amplifier to an S1G4 - and
eliminate the gap between 3 & 4 GHz.
Ask your AR Sales Associate for details or call us.

rf/microwave instrumentation

No Competition

AR is known throughout the far corners of the world for our unique ability to make high quality products that are also exceptional values. Our unwavering commitment to making quality=value gives us a strong competitive edge. And it gives every company that uses our products an edge in their industries.

Value is Multi-Dimensional.

At AR, value is more than a good price. It's multi-dimensional - from innovation to application. We exceed our customers' expectations every day with products and services that out-perform the competition on every level.

These Are No Ordinary Amps!

AR amps have power and abilities far beyond those of ordinary amps. They're more powerful than the competition. Able to deliver power and not foldback. They're virtually indestructible.

Our amps deliver real power to the load, where it really counts. Competitors' amps begin to foldback at a VSWR of 2:1; and their output decreases significantly at 3:1.
AR high power amps don't even begin to foldback until 6:1, and the lower power ones don't fold back at all. A lot goes into making our amps so superior:

- ***Technical Innovation***

We're always pushing the boundaries and exploring new ways to give you what you need - plus a little more. Our commitment to the highest levels of innovation and state-of-the-art design means we're continuously anticipating and responding to market needs and changing standards.

- ***Quality Build and Workmanship***

Only the best materials go into AR products. All are built to exacting standards by the finest craftsmen and designed by the very best engineering minds.

- ***Durability and Longevity***

The workhorses of the industry, AR amps last twice as long as standard amplifiers. They just don't give out!

- ***Mismatch Tolerance Second to None***

An unparalleled level of mismatch capability is what really makes our amps pop in a crowd. Most AR amps offer infinite VSWR tolerance - even our highest power instruments operate at full capacity into ratios as high as 6.0:1. Because they continue to provide power when most amplifiers fold-back or shut down, AR amps cost less, watt per watt, than competitive amplifiers.

- ***Better Choices, More Options***

Another way AR gives you the competitive edge is by making it easy to find exactly the amplifier you need. Our microwave amps cover the range from .8 to 45 GHz with power from 1-16,000 watts. We've got those hard-to-find combinations of power & bandwidth in frequency increments and power output to meet your most demanding specs.

- ***Worldwide Support Network***

We know testing can be a long and arduous process. So each purchase comes with the support of a worldwide network of technical and sales support that's second to none.

- ***The Strongest Warranties in the Business***

AR amps carry a 3-year warranty - that's twice the industry standard! The 200T1G3A, 200T2G8A, 200T8G18A, 250T1G3 and the 250T8G18 are backed by our exclusive 2-year/9,000-hour warranty on their traveling-wave tubes (1 year on other models) and by AR's industry-leading 3-year warranty on the rest of the instrument.

When you make the best products, you can support them with the best warranty. Nobody beats our products and nobody has a better, more comprehensive warranty.

Need More Proof?

Want to see exactly how AR microwave amps give you more for your money?

Go to www.ar-worldwide.com/apspdfs.asp to see Application Note #27 for details.

"S" Series – 10 Reasons Why

Ten Powerful Examples of Value, Quality and Innovation.

1. Great-Shape Wireless Testing.

Recognize this shape above? If you're in telecom testing you do. It's the shape you hope for when testing driver amplifiers and other wireless transmission equipment. You can easily adjust the gain, backed off from 100%, to find an optimized operating point where distortion and spectral regrowth are minimized to get superior signal fidelity (or low distortion). This accurately lets the user analyze what distortion or spectral regrowth is coming from the base station amplifier and related components.

2. Linear, Clean Telecom Applications.

AR amps amplify host signals with the low intermodulation characteristics needed to test for signal spillover. So you don't waste bandwidth - an all too precious resource - in transmission.

We've enhanced the design of our "S" series amps to better accommodate multi-tone testing. Signals are reproduced with even greater linearity. Spurious signals, noise figures and distortion are lower than ever. With full-rated power across the band.
Please refer to Application Notes 37 and 39B for more information.

3. Mismatch Capability.

"S" Series amps generate 100% of rated power and make it available to the load even when mismatch is severe. 100% of the power is available and delivered to the output device 100% of the time. Many competitive amplifiers see reflection (high VSWR) and limit output or shut down. Note the competitive response to this basic performance claim. We haven't found one yet that meets it.

4. Class A Design That Eliminates Mismatch.

All Class A's are not created equal. "S" Series amps offer exceptional design features for load tolerance:

- transistor pairs, combined with quadrature couplers - more rugged than the single output arrangement found in lesser-grade Class A's.
- internal power combiners that can withstand high reflected power.
- top quality, high-power-handling internal directional couplers.
- switching power supplies to increase efficiency and reduce internal heat load.

5. Expandable Power

AR high-power "S" Series amplifiers allow you to add power to existing amps as needed. There's no need to toss out a perfectly good amp and start all over again. Our "Subampability" concept also enables you to add incremental power using existing amps.

The latest examples are Models 10S4G11A (10 watts, 4-10.6 GHz) and 15S4G8A (15 watts, 4-8 GHz). A fairly simple upgrade performed by AR expands the 10S4G11A to a 20S4G11A (20 watt, 4-10.6 GHz) … and the 15S4G8A to a 35S4G8A (35 watts, 4-8 GHz).

The 204SG11A and the 35S4G8A are like building blocks that can easily be expanded by adding additional sub amps and controller/combiner units to obtain great output levels.

6. Cost-Effective Upgrades

AR has a special offer that enables you to upgrade our S1G3 Amplifier to an S1G4 - to eliminate gaps as you expand your frequency coverage. AR will retune your S1G3 series amplifier (.8 - 3.0 GHz) to an S1G4 amplifier (.8 - 4.2 GHz) to eliminate the frequency gap between 3 GHz and 4 GHz when you expand your frequency coverage with the purchase of a new S4G8 (4 - 8 GHz) or S4G11 Series Amplifier (4 - 11 GHz).

The charge for the retuning will be the difference in price between the S1G3 and the S1G4. This offer is only valid for customers who purchase the S4G8 or S4G11 solution in conjunction with the upgrade. The price for retuning is based on the S1G3 and S1G4 prices in effect at the time you order a new S4G8 or S4G11 series amplifier.

7. Telecom Testing To Telcordia 8.5 V/m.

"S" Series amps provide radiated susceptibility to the 0.8 to 4.2 GHz segment of the Telcordia specification. Our 10ST1G18A and 35ST1G18 hybrids are specially designed to meet the upper end (0.8 to 10 GHz) of this spec's requirements. The 15T4G18A and and 40T4G18 and "S" Series amps provide another option for the low-harmonic requirements (-20dBc) of Telcordia testing. The rest of the requirement is covered by AR "W" and "A" Series. See pg. 6 for more. Note: Telcordia testing ends at 10 GHz. Our "S" Series amps can cover this requirement in 2 bands, 0.8 to 4.2 GHz and 4.2 to 10.6 GHz.

8. Comprehensive.

The Medical Devices Directive (MDD) is comprehensive and stringent. Its EMC aspect is covered by EN 60601-1-2:2001. AR "S" and "W" Series amps provide the power you need to meet the RF portion required by the current spec.

9. General Lab Testing

AR amps, along with signal generators, oscilloscopes, power meters and spectrum analyzers are classified as the best basic lab test equipment by experts everywhere. They remain a benchtop staple in research and development everywhere.

10. Accessories and Options

Alternative operating voltages are also possible.
Antennas and directional couplers are matched in frequency and power. Cables, waveguide and adapters are also available. (Check AR's website and Price List for a full listing of all accessories.)

0.8 to 4.2 GHz.

10S1G4A Solid State Amplifier

10 watts. 0.8-4.2 GHz CW

Rated Power Output 10 watts min.
Input For Rated Output 1 milliwatt max.
Power Output @ 3dB compression
Nominal 18 watts / min. 13 watts
Power Output @ 1dB compression
Nominal 16 watts / min. 10 watts
Flatness ±1.5dB typ. / ±2dB max.
Frequency Response 0.8 - 4.2 GHz instantaneously
Gain (at max. setting) 40dB min.
Gain Adjustment (continuous range)
10dB min. (4096 steps remote)
Input Impedance 50 ohms, VSWR 2.0:1 max.
Output Impedance 50 ohms, nominal
Mismatch Tolerance
100% of rated power without foldback. Will operate without damage or oscillation with any magnitude and phase of source and load impedance (See Application Note #27).
Harmonic Distortion Minus 20dBc max. at 10 watts
Third Order Intercept Point 52dBm typ.
Primary Power (selected automatically)
90 - 132, 180 - 264 VAC
50/60 Hz, single phase
250 watts max.
Remote Interfaces IEEE-488, RS-232
Connectors
RF input Type N female on front panel
RF output Type N female on front panel
Remote Interfaces
IEEE-488 24 pin female
RS-232 9 pin Subminiature D female
Remote Interlock 15 Pin Subminiature D
Cooling Forced air (self contained fans)
Weight 20.5 kg (45 lb)
Size (WxHxD)
50.3 x 15.5 x 37.6 cm / 19.8 x 6.1 x 14.8 in.

25S1G4A Solid State Amplifier

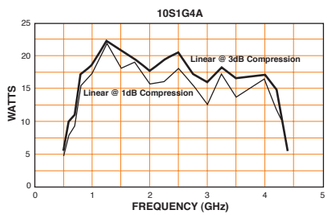
25 watts. 0.8-4.2 GHz CW

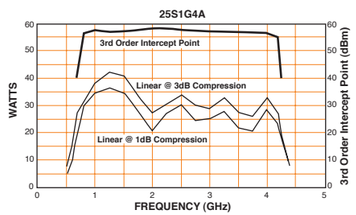
Rated Power Output 25 watts min.
Input For Rated Output 1 milliwatt max.
Power Output @ 3dB compression
Nominal 32 watts / min. 25 watts
Power Output @ 1dB compression
Nominal 27 watts / min. 20 watts
Flatness ±1.5dB typ. / ±2dB max.
Frequency Response 0.8 - 4.2 GHz instantaneously
Gain (at max. setting) 44dB min.
Gain Adjustment (continuous range)
10dB min. (4096 steps remote)
Input Impedance 50 ohms, VSWR 2.0:1 max.
Output Impedance 50 ohms, nominal
Mismatch Tolerance
100% of rated power without foldback. Will operate without damage or oscillation with any magnitude and phase of source and load impedance. (See Application Note #27)
Third Order Intercept
See chart. The third order intercept points for this chart have been determined using two tones spaced 1 MHz apart. This is typical for W-CDMA systems. Closer tone spacing such as 60 kHz generally provides about a 1db to 3db improvement in the IP.
Harmonic Distortion Minus 20dBc max. at 20 watts
Spurious Minus 73dBc typ.
Phase Linearity ±1 deg/100 MHz, typ.
Primary Power (selected automatically)
90 - 132, 180 - 264 VAC
50/60 Hz, single phase
340 watts max.
Connectors
RF input Type N female on front panel
RF output Type N female on front panel
Remote Interfaces
IEEE-488 24 pin female
RS-232 9 pin Subminiature D female
Safety Interlock 15 pin Subminiature D
Cooling Forced air (self contained fans)
Weight 35 kg (77 lb)
Size (WxHxD)
50.3 x 20.3 x 54.6 cm / 19.8 x 8 x 21.5 in.

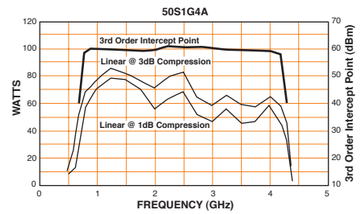
50S1G4A Solid State Amplifier

50 watts. 0.8-4.2 GHz CW

Rated Power Output 50 watts min.
Input For Rated Output 1 milliwatt max.
Power Output @ 3dB compression
Nominal 70 watts / min. 50 watts
Power Output @ 1dB compression
Nominal 60 watts / min. 40 watts
Flatness ±1.5dB typ. / ±2dB max.
Frequency Response 0.8 - 4.2 GHz instantaneously
Gain (at max. setting) 47dB min.
Gain Adjustment (continuous range)
10dB min. (4096 steps remote)
Input Impedance 50 ohms, VSWR 2.0:1 max.
Output Impedance 50 ohms, nominal
Mismatch Tolerance
100% of rated power without foldback. Will operate without damage or oscillation with any magnitude and phase of source and load impedance. (See Application Note #27)
Third Order Intercept
See chart. The third order intercept points for this chart have been determined using two tones spaced 1 MHz apart. This is typical for W-CDMA systems. Closer tone spacing such as 60 kHz generally provides about a 1db to 3db improvement in the IP.
Harmonic Distortion Minus 20dBc max. at 50 watts
Spurious Minus 73dBc typ.
Phase Linearity ±1 deg/100 MHz, typ.
Primary Power (selected automatically)
90 - 132, 180 - 264 VAC
50/60 Hz, single phase
600 watts max.
Connectors
RF input Type N female on front panel
RF output Type N female on front panel
Remote Interfaces
IEEE-488 24 pin female
RS-232 9 pin Subminiature D female
Safety Interlock 15 pin Subminiature D
Cooling Forced air (self contained fans)
Weight 45 kg (100 lb)
Size (WxHxD)
50.3 x 24.9 x 54.6 cm / 19.8 x 9.8 x 21.5 in.







100S1G4 Solid State Amplifier

100 watts. 0.8-4.2 GHz CW

Rated Power Output 100 watts min.
Input For Rated Output 1 milliwatt max.
Power Output @ 3dB compression
Nominal 120 watts / min. 90 watts
Power Output @ 1dB compression
Nominal 100 watts / min. 70 watts
Flatness
±1.5dB typ. / ±2dB max. / ±1dB with Internal Leveling
Frequency Response 0.8 - 4.2 GHz instantaneously
Gain (at max. setting) 50dB min.
Gain Adjustment (continuous range)
15dB min. (4096 steps remote)
Input Impedance 50 ohms, VSWR 2.0:1 max.
Output Impedance
50 ohms, nominal / VSWR 2.0:1 max.
Mismatch Tolerance
100% of rated power without foldback. Will operate without damage or oscillation with any magnitude and phase of source and load impedance. (See Application Note #27)
RF Power Display 0 - 150 Watts
Third Order Intercept
See chart. The third order intercept points for this chart have been determined using two tones spaced 1 MHz apart. This is typical for W-CDMA systems. Closer tone spacing such as 60 kHz generally provides about a 1db to 3db improvement in the IP.
Harmonic Distortion Minus 20dBc max. at 80 watts
Spurious Minus 73dBc typ.
Phase Linearity ±1 deg/100 MHz, typ.
Primary Power (selected automatically)
90 - 132, 180 - 264 VAC
50/60 Hz, single phase
1200 watts max.
Connectors
RF input Type N female on front panel
RF output Type N female on front panel
Remote Interfaces
IEEE-488 24 pin female
RS-232 9 pin Subminiature D female
ALC & Pulse Type BNC on front panel
Safety Interlock 15 pin female Subminiature D
Cooling Forced air (self contained fans)
Weight 86.2 kg (190 lb)
Size (WxHxD)
50.3 x 47 x 61 cm / 19.8 x 18.5 x 24 in.

200S1G4A Solid State Amplifier

200 watts. 0.8-4.2 GHz CW

Rated Output Power 200 watts min.
Input For Rated Output 1 milliwatt max.
Power Output @ 3dB compression
Nominal 230 watts / min. 180 watts
Power Output @ 1dB compression
Nominal 210 watts / min. 160 watts
Flatness ±2.5dB max. / ±1dB with Internal Leveling
Frequency Response 0.8 - 4.2 GHz instantaneously
Gain (at max. setting) 53dB min.
Gain Adjustment 15dB min.
Input Impedance 50 ohms, VSWR 2.0:1 max.
Output Impedance 50 ohms, VSWR 2.5:1 max.
Mismatch Tolerance
100% of rated power without foldback. Will operate without damage or oscillation with any magnitude and phase of source and load impedance. (See Application Note #27)
RF Power Display Digital, forward and reflected
Third Order Intercept Point 64dBm typ.
Harmonic Distortion
Minus 20dBc max. at 200 watts
Primary Power
120 - 240 VAC
50/60 Hz, single phase
2150 watts max.
Connectors
RF input Type N female on front panel
RF output Type N female on front panel
External leveling inputs Type BNC female on front panel
Pulse Modulation input Type BNC female on front panel
Detected RF output Type BNC female on front panel
Remote computer interface
IEEE-488 (GPIB)& RS-232 female connector on rear panel
Remote Computer Interface (Fiber Optic)
ST Conn Tx and Rx RS-232
Operate Interface 25 pin Subminiature D on rear panel
Safety Interlock 15 pin female Subminiature D on rear panel
Cooling Forced air (self contained fans)
Weight 172.4 kg (380 lb)
Size (WxHxD)
56.1 x 109 x 67.1 cm / 22.1 x 43 x 26.4 in.

400S1G4 Solid State Amplifier

375 watts. 0.8-4.2 GHz CW

Rated Power Output 375 watts min.
Input For Rated Output 1 milliwatt max.
Power Output @ 3dB compression
Nominal 430 watts / min. 335 watts
Power Output @ 1dB compression
Nominal 390 watts / min. 300 watts
Flatness ±3.5dB max. / ±1dB with Internal Leveling
Frequency Response 0.8 - 4.2 GHz instantaneously
Gain (at max. setting) 56dB min.
Gain Adjustment 15dB min.
Input Impedance 50 ohms, VSWR 2.0:1 max.
Output Impedance 50 ohms, VSWR 2.5:1 max.
Mismatch Tolerance
100% of rated power without foldback. Will operate without damage or oscillation with any magnitude and phase of source and load impedance. (See Application Note #27)
RF Power Display Digital, forward and reflected
Third Order Intercept Point 66dBm typical
Harmonic Distortion Minus 20dBc max. at 375 watts
Primary Power
200 - 240 VAC
50/60 Hz, single phase
5000 watts
Connectors
RF input Type N female on front panel
RF output Type 7-16 on rear panel
External leveling inputs Type BNC female on front panel
Pulse Modulation input Type BNC female on front panel
Detected RF output Type BNC female on front panel
Remote computer Interfaces
IEEE-488 (GPIB) & RS-232 female connector on rear panel
Remote Computer Interface (Fiber Optic)
ST Conn Tx and Rx RS-232
Safety Interlock 15 pin female Subminiature D on rear panel
Cooling Forced air (self contained fans)
enters front and bottom
Weight 336 kg (850 lb)
Size (WxHxD)
Cabinet 1
56.1 x 109 x 67.1 cm / 22.1 x 43 x 26.4 in.
Cabinet 2
56.1 x 152.4 x 67.1 cm / 22.1 x 60 x 26.4 in.