

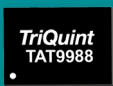
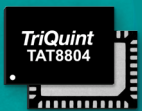
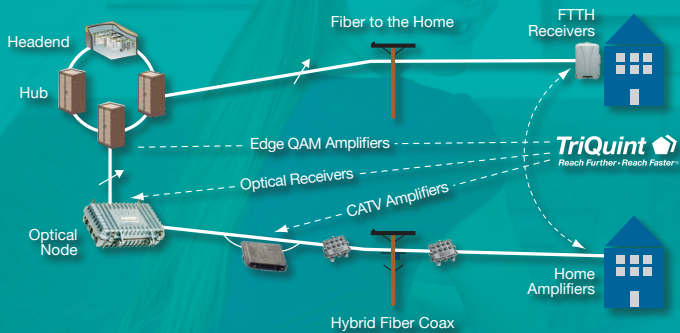
2014

# TriAccess™ Solutions

## Advanced CATV & High-Speed Data

TriQuint's complete cable TV (CATV) and fiber to the home / premises (FTTH / FTTP) TriAccess™ product line is designed around the needs of high-speed broadband service providers. The need for greater bandwidth and two-way, high-speed service, support for multi-screen environments and higher frequencies all require greater system flexibility and capability. The TriAccess line enables 75 Ohm high-definition video, voice and data services through increased efficiency, lower operational costs and smaller bills of materials. TriQuint's innovative TriAccess portfolio delivers integrated, high-efficiency GaAs and GaN RFICs, modules, filters and control products that simplify design and enable fast-to-market strategies.

### Innovative, High-Performance Amplifiers from Curb to Carport™



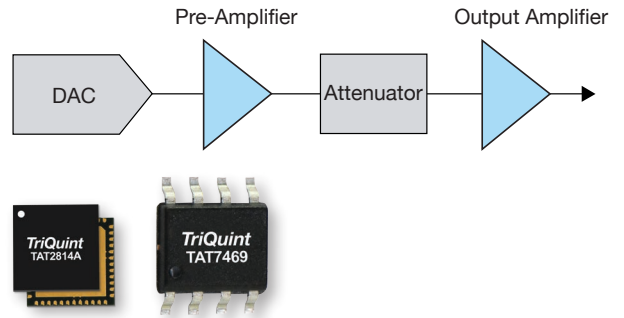
**TriQuint**   
Reach Further · Reach Faster™

# Solutions for CATV / FTTH & High-Speed Data Applications

## Edge QAM / DOCSIS® Amplifiers

More efficient use of cable spectrum is enabling a number of new subscriber services. Whether for Video on Demand, higher throughput DOCSIS data or Switched Digital Video channels, the use of efficient and compact Edge QAM systems facilitates successful network roll-outs.

The TriAccess portfolio includes RFICs specifically designed to meet the stringent RF requirements of DOCSIS-based Edge QAM systems. TriQuint solutions can reduce power consumption up to 40% and can cut space requirements 80%. The TGA2806-SM, TGA2807-SM, TAT7467H and TAT7469 provide a complete set of options for low-power consumption Edge QAM. TriQuint's TAT2814A is an integrated, adjustable (variable) gain, high-efficiency amplifier that meets the DOCSIS standard with +4dB typical performance margin.



### Benefits

- 5-8 Volt bias considerations – optimized for DOCSIS
- On-chip linearization = lower-power consumption

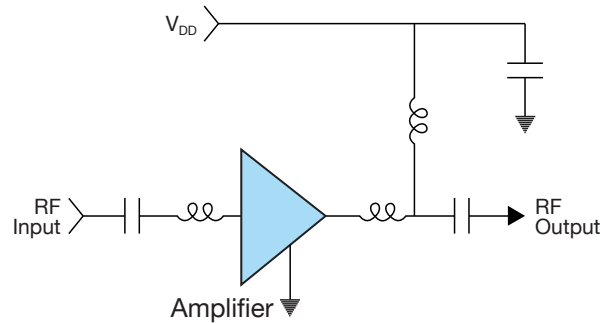
### Applications

- Edge QAM systems: 40-1200 MHz
- Cable modem termination systems
- Low-voltage headend / infrastructure applications

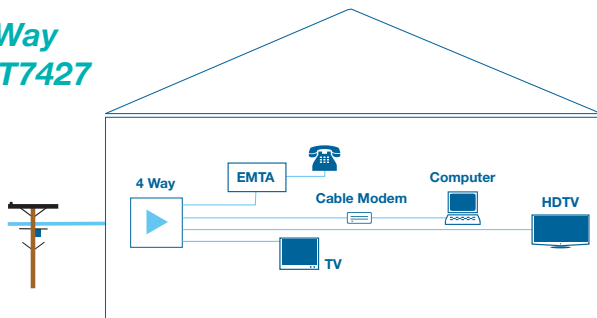
## Subscriber / Home Amplifiers

Amplification at the subscriber premises has become increasingly segmented. From simple single port, video-only amplification to full multiport, multi-service support, TriQuint products include the RFIC and RF switch devices needed to meet today's subscriber amplification requirements.

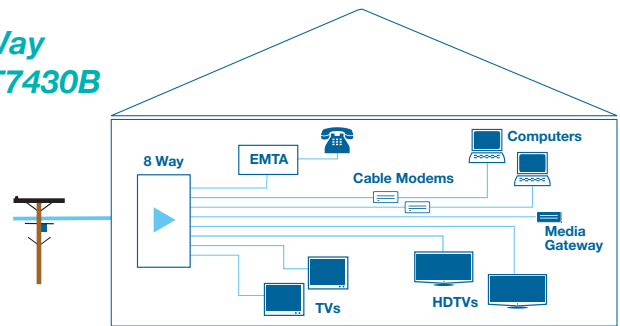
TriQuint's TriAccess line of high-performance ICs, including drop amplifiers, offer multiple gain levels that cost-effectively enable central gateway and multi-room architectures as well as MOCA (Multi-media Over Coax Alliance), or Ethernet over coax applications. TriQuint's TAT7427, TAT7430B, TAT7457 and TAT7461 give manufacturers a competitive edge through a full range of solutions that meet the new home / subscriber architecture standards sought by leading MSOs.



### 4-Way TAT7427



### 8-Way TAT7430B



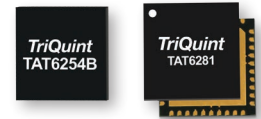
# Solutions for CATV / FTTH & High-Speed Data Applications

## Benefits

- Best-in-class single-ended amplifier distortion
- High-performance repeatable pHEMT process
- Excellent return loss
- Multiple gain level applications
- Low noise / low distortion

## Applications

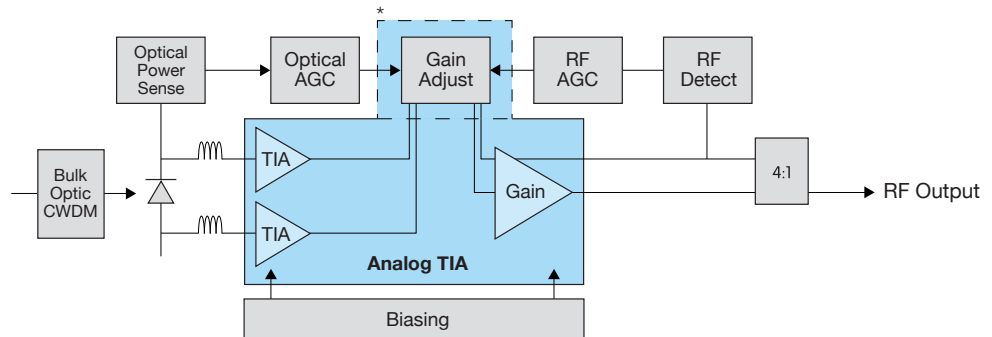
- Drop amplifiers for multi-room or central gateway architectures
- MOCA or Ethernet over coax amplifiers
- Distribution amplifier gain blocks



## Fiber to the Home / RFoG Receivers

A highly-effective way to bring broadband data capability to the subscriber is to drive fiber all the way to the premise. Use of RFoG (RF over Glass) is increasingly popular for new construction and network upgrades since it leverages the current CATV infrastructure, offering a smooth and incremental upgrade path in particularly competitive markets. To help designers cost-effectively meet the challenge of satisfying RF requirements at the Residential-Optical Network Unit (R-ONU), the TriQuint TriAccess portfolio includes a family of RFICs that satisfy the challenging gain, noise and distortion requirements of PONs (Passive Optical Networks).

TriQuint solutions, including the TAT6254B, TAT6254C and TAT6254D, are specifically designed to support current GPON and emerging RFoG specifications. Their ultra low noise, dual single die and single package convenience offer the best means to extend optical link budgets for easier, more cost-effective network deployments.



\* TAT6281 includes additional gain adjust function.

## Benefits

- Ultra low noise GaAs: as low as 2.9 pA/rHz EIN
- Dual single die TIA for repeatable CSO performance
- Industry proven single package solution
- Best optical link budget for easier, more cost-effective deployment
- Low distortion

## Applications

- FTTH downstream 50-1200 MHz receivers
- FTTH RFoG optically detected AGC
- FTTH with RF detected AGC
- FTTH in all-QAM applications

# Solutions for CATV / FTTH & High-Speed Data Applications

## Infrastructure Return Path Amplifiers

Description	Frequency Range (MHz)	Gain (dB)	OIP3 (dBm)	NF (dB)	P1dB (dBm)	V / Idd (V / mA)	Return Loss (dB, typ)	Package Style	Part Number
Integrated VGA Amplifier	5 - 300	36	40	4.5	24	8 / 325	Input 19, Output 20	QFN 6x6	TAT3814

## CATV Receiver Amplifiers

Application	Frequency Range (MHz)	Gain (dB)	Noise		Voltage / Current (V / mA)	Package Style	Part Number
			NF (dB)	Equivalent Input Noise (pA / rtHz)			
<b>Single-Stage</b>							
TIA	DC - 2000	19 <sup>1</sup>	1.7	-	5 <sup>2</sup> / 100	SOT-89	TAT7457
Output Stage	50 - 1200	16	2.3	-	6 / 130	SOT-89	TAT7461
V-ONU Gain Stage	50 - 2600	16.5	2.5	-	5 / 100	SOT-89	TAT7460
<b>Multi-Stage</b>							
Low Noise FTTH CATV TIA	50 - 1200	36	-	2.9	5 or 12 / 200 or 100	QFN 4x4	TAT6254B
Low Noise FTTH CATV TIA	50 - 1200	33	-	3.9	5 or 12 / 200 or 100	QFN 4x4	TAT6254C
Low Noise FTTH CATV TIA	50 - 1200	32	-	4.0	5 or 12 / 200 or 100	QFN 4x4	TAT6254D
Integrated FTTH CATV TIA	50 - 1200	33	-	3.8	5 / 220	QFN 6x6	TAT6281

NOTES: 1 = With external 820 ohm feedback resistor, open loop gain of 25dB, 2 = Operates from 5V - 8V

## DOCSIS® / Edge QAM Headend Amplifiers

DOCSIS Approx Output Margin (dB)	OIP3 (dBm)	Gain (dB)	Single-Die Dual Adjacent Amplifiers <sup>1</sup>	On-Chip Linearization	Voltage / Current (V / mA)	Package Style	Part Number
<b>Input Stage</b>							
Input Stage	41	13	No	No	5 to 8 / 190	SOIC-8	TAT7466
Input Stage	38	17.5	No	No	5 to 8 / 235	SOIC-8	TAT7469
<b>Output Stage</b>							
+2	43	11	Yes	No	5 / 320	SOIC-8	AH22S
+3	43	17	Yes	Yes	5 / 380	SOIC-8	TAT7467H
+4	43	20	Yes	No	5 to 8 / 350	QFN 5x5	TGA2806-SM
+4	44	18.5	Yes	No	5 to 8 / 350	QFN 5x5	TGA2807-SM
<b>Integrated RF Chain</b>							
+4	45	30	Yes	No	5 / 250 - 8 / 380	QFN 7x7	TAT2814

NOTES: 1 = OIP2 > +70 dBm with careful balun selection, parts with single-chip construction inherently have better OIP2, OIP2 is 100% production tested for solutions without matched devices

## CATV Infrastructure Amplifiers

Application	OIP3 (dBm)	Gain (dB)	CTB (dBc)	CSO (dBc)	Single-Die Dual Adjacent Amplifiers <sup>1</sup>	On-Chip Linearization	Voltage / Current (V / mA)	Package Style	Part Number
CATV GaAs Power Doubler Hybrid	53	26	-78	-75	No	-	24 / 440	SOT115J	TAT8884HO
CATV GaN Power Doubler Hybrid	-	24	-69	-75	No	-	24 / 440	SOT115J	TAT8888
24V GaN Power Doubler MMIC	-	24	-69	-75	Yes	-	24 / 445	40-pin 5x7mm QFN	TAT9988
12 / 24V Push-Pull	-	28 - 34 <sup>3</sup>	-62.5 <sup>4</sup>	-75 <sup>4</sup>	Yes <sup>2</sup>	Yes	24 / 265 - 335	SOIC-16W	TAT8858
12 / 24V Power Doubler	-	22 - 27 <sup>3</sup>	-70 <sup>5</sup>	-75 <sup>5</sup>	Yes <sup>2</sup>	Yes	24 / 340 - 390	SOIC-16W	TAT8857
12V Power Doubler	52	11	-80 <sup>6</sup>	-72 <sup>6</sup>	Yes	No	12 / 540	SOIC-16W	TAT8801A1H
12V Power Doubler	56	21	-79 <sup>7</sup>	-73 <sup>7</sup>	Yes	Yes	12 / 650	5x7mm QFN	TAT8804D1H

NOTES: 1 = Parts with single-chip construction inherently have better 2nd order linearity, 2 = Multiple stages on different die, 3 = Gain adjustable with external feedback network, 4 = 265 mA, 44 dBmV/ch flat 80ch NTSC, 5 = 380 mA, 47 dBmV/ch, flat 80ch NTSC, 6 = 112ch flat, 44 dBmV/c, 7 = Measured at +58 dBmV/ch eq output, 80ch NTSC + QAM to 1 GHz, 15.6 dB tilt

Samples are now available

# Solutions for CATV / FTTH & High-Speed Data Applications

## Home Amplifiers, Single Ended Amplifiers

Application	Frequency Range (MHz)	Gain (dB)	P1dB / OIP3 / OIP2 (dBm)	CTB <sup>1</sup> (dBc)	CSO <sup>1</sup> (dBc)	Voltage / Current (V / mA)	Package Style	Part Number
Multiple Use	DC - 2000	16 / 21 <sup>2</sup>	21 / +38 / +60	-80	-65	5 / 100	SOT-89	TAT7457
MSO Standard	50 - 1200	16	22.5 / +39 / +61	-88	-72	6 / 130	SOT-89	TAT7461
High Gain (MOCA)	50 - 1200	18.5	22.5 / +39 / +61	-88	-70	6 / 145	SOT-89	TAT7427
High Gain (MOCA / Multi Port)	50 - 1200	22.8	22 / +41 / +65	-81	-68	8 / 190	SOT-89	TAT7430B
CATV / SAT Bands	50 - 2600	16.5	20.5 / +36 / +58	-72	-61	5 / 100	SOT-89	TAT7460B1A

NOTES: 1 = Input + 10 dBmV/ch, 80ch NTSC flat, 2 = Adj. with ext. feedback resistor.

## General Purpose CATV Amplifiers

Description	Frequency Range (MHz)	P1dB / OIP3 (dBm)	Gain (dB)	NF (dB)	Pout (dBmV / ch, 77ch)	Voltage / Current (V / mA)	Package Style	Part Number
Single Ended Amplifier	50 - 1200	21 / 38	19	2.0	-	5 / 100	SOT-89	TAT7457
Dual HBT Amplifier	50 - 1200	20 / 37	13.5	4.5	34	>7 / 160	SOIC-8	AG606
Dual MESFET Amplifier	50 - 1200	25.5 / 43	11.1	4.5	39	5 / 320	SOIC-8	AH22S
Dual Amplifier	50 - 1200	23 / 40	18	4.0	36	5 - 8 / 235	SOIC-8	TAT7469
Differential Amplifier	50 - 1200	24 / 43	17	4.5	42	5 / 380	SOIC-8	TAT7467H
Dual pHEMT Amplifier	50 - 1200	22 / 41	13	4.0	39	5 - 8 / 190	SOIC-8	TAT7466
Single Ended Amplifier	50 - 2600	18 / 36	16.5	2.5	30	5 / 100	SOT-89	TAT7460B1A

## Protectors

Description	Application	Trigger Voltage (V)	Leakage Current (nA)	Capacitance (femto Farads)	Package Area (mm <sup>2</sup> )	Package Style	Part Number
3-Terminal Dual Bi-Directional MESFET Protection Device	ESD & Surge Protection	V <sub>TR</sub> = 25V V <sub>TR</sub> = 18V V <sub>TR</sub> = 41V	I = 20 @ 1V, 500 @ 15V I = 20 @ 1V, 500 @ 15V I = 15 @ 1V, 500 @ 15V	C = 290 @ 1V, 10 MHz C = 290 @ 1V, 10 MHz C <sub>3,2</sub> = 220 @ 1V, 10 MHz	1.8	T / SLP-3	TQP200002

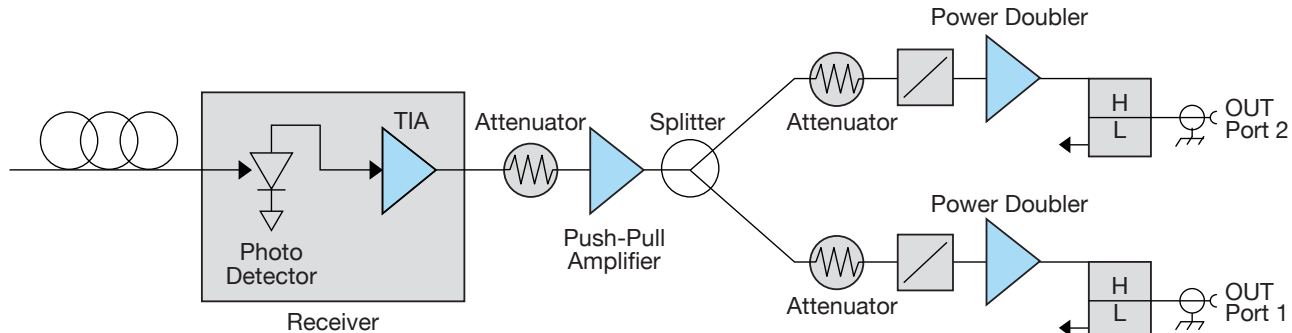
## SAW Filters

Description	Frequency Range (MHz)	Bandwidth (MHz)	Insertion Loss (dB)	Modes of Operation	Package Size (mm)	Part Number
Cable IF Filter	36.15	8	22.0 max	SE	DIP-O	855748
Cable IF Filter	44	6	22.0 max	SE	DIP-O	855079
Cable IF Filter	44	6	22.0 max	SE	24.6x9.0	856129
Cable IF Filter	110.59	1	7.8 max	SE	13.3x6.5	855659
Cable IF Filter	202.75	1.2	7.6 max	SE	13.3x6.5	855068
Cable IF Filter	499.25	1	9.0 max	SE	9.0x7.0	855104
Tuner IF Filter	1086	10	5.0 max	BAL	3.0x3.0	855964
Tuner IF Filter	1086	10	-	BAL	3.0x3.0	856330
Tuner IF Filter	1090	10	5.8 max	BAL	3.8x3.8	856096
Tuner IF Filter	1220	10	5.5 max	BAL	3.0x3.0	856298
Tuner IF Filter	1220	50	-	BAL	3.8x3.8	856598
Tuner IF Filter	1250	100	6.5 typ	BAL / BAL	3.0x3.0	856653

# Solutions for CATV / FTTH & High-Speed Data Applications

## CATV Infrastructure Amplifiers

TriQuint's TriAccess CATV infrastructure products are designed for cable-specific performance. TriQuint supports the move to 'go green' in CATV infrastructure with a wide range of devices optimized for 12V operation. This includes our new TAT8804DH1 that delivers high RF output, excellent CSO, CTB and CCN performance at 2dBmV higher output compared to traditional 12V MMICs. It operates with low 650mA power consumption in 12V systems, yet with output similar to 24V hybrids. TriQuint's new TAT9988 is the first direct-to-board GaN MMIC amplifier that delivers excellent gain (24dB) and excellent composite distortion performance (CTB / CSO). The TriAccess portfolio includes the industry's first return path amplifier, the TAT3814, that delivers ample bandwidth (5-300 MHz), low noise, wide attenuation range and gain to support DOCSIS 3.0+ channel bonding. The TAT8801A1H power doubler is ideal for line extenders and similar applications where cost-efficiency and performance are key requirements. TriQuint's infrastructure portfolio continues to grow, offering tested and innovative solutions to meet challenging operational requirements while delivering the service broadband subscribers demand.



### Benefits

- Single package multi-chip module
- Integrated low-distortion GaAs
- High-efficiency / low-power consumption
- Low distortion on-chip linearization
- Complete offering of product gain levels

### Applications

- Hybrid fiber coax nodes
- CATV line extenders
- Distribution amplifiers