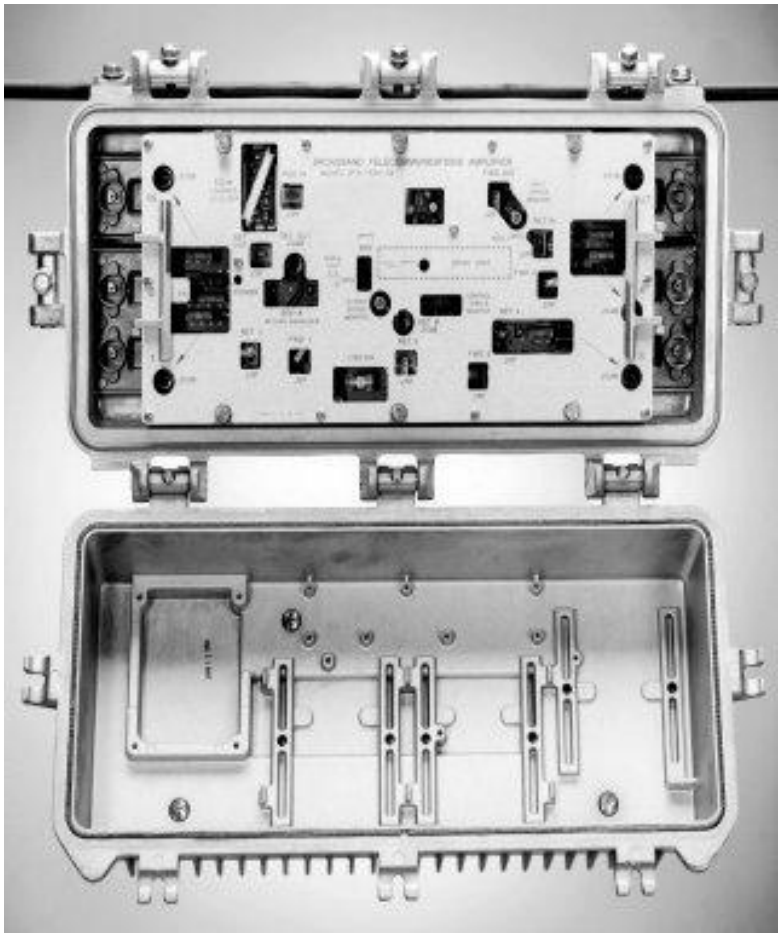
Table of Contents

Amplifiers
Broadband Telecommunications 4 Port, Parallel Hybrid Amplifier [BTD-75]**



FEATURES

- **4 power doubled outputs (hybrid per port)**
- **High operational gain**
- **Bode equalization (thermal or auto controlled)**
- **Power factor correction**
- **High voltage tolerance**
- **LIFELINE (TM) status monitor capable**

The BTD-75**, the first in the new family of Broadband Telecommunications Amplifiers, is an integrated RF

amplifier and power supply in the same chassis. It is a 750 MHz, RF distribution amplifier supplying 35 dB of operational gain from a common input to each of 4 output ports. Each port has a dedicated power-doubled hybrid to provide the highest in distribution levels. The high distribution levels make the BTD-75 ideal for maximizing coaxial distribution from a single active, for moderate to high population densities. The increased coaxial distribution in turn reduces the need to cascade amplifiers. The gain of the BTD-75 permits the amplifier to be strategically placed within the system topology for distributing broadband telecommunications signals.

In addition, the mechanical size, high gain, and output capability of the BTD-75 are ideal for upgrading existing tree and branch architecture to FTTF designs.

The BTD-75 is shipped with a thermally-guided attenuation pad to insure constant gain of the hybrid IC's for all operating temperatures. An interstage Bode equalizer in each BTD-75, may be controlled manually (standard), thermally (TDU, optional) or with a single pilot, closed-loop driver (ADU-***, optional). The Bode equalizer is provided to compensate for coaxial cable changes due to temperature swings. The Bode equalizer, JXP-THERM (thermal compensation network), and 3 gain-stage design permit the BTD-75 to maintain its distortion performance over temperature.

The BTD-75 provides power-factor correction in the power supply design. Power factor correction lowers the AC current draw of the BTD-75 while improving the efficiency of the system power supply. The integrated power supply of the BTD-75 is capable of delivering 3.5 Amperes of DC at +24.0 Volts.

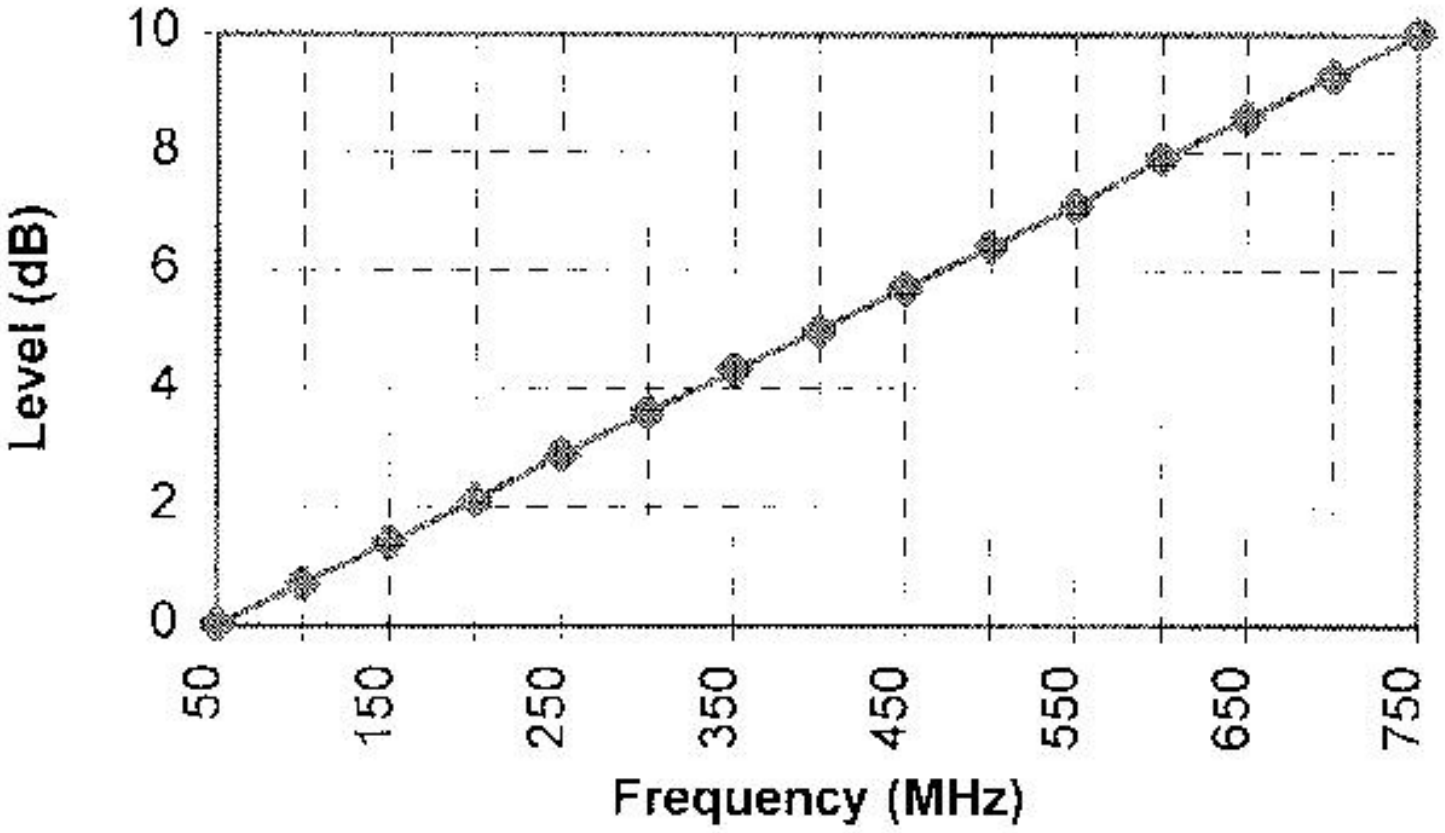
The BTD-75 has been designed with a high voltage tolerance, and is shipped with a surge arrestor that fires at 230 Volts. The increased robustness of the power supply is evident by its capability to provide regulated B+ even with voltages just below 230 Volts. The high voltage rating for the surge arrestors will increase its operational life by reducing the number of firings that normally occur with lower thresholds. The BTD-75 offers an electronic crowbar option, FTEC-BTA, if the operator prefers.

The BTD-75 is capable of being remotely monitored by the LL-BTA-52/5.5, which is a LIFELINE compatible module that can report back parameters such as, but not limited to:

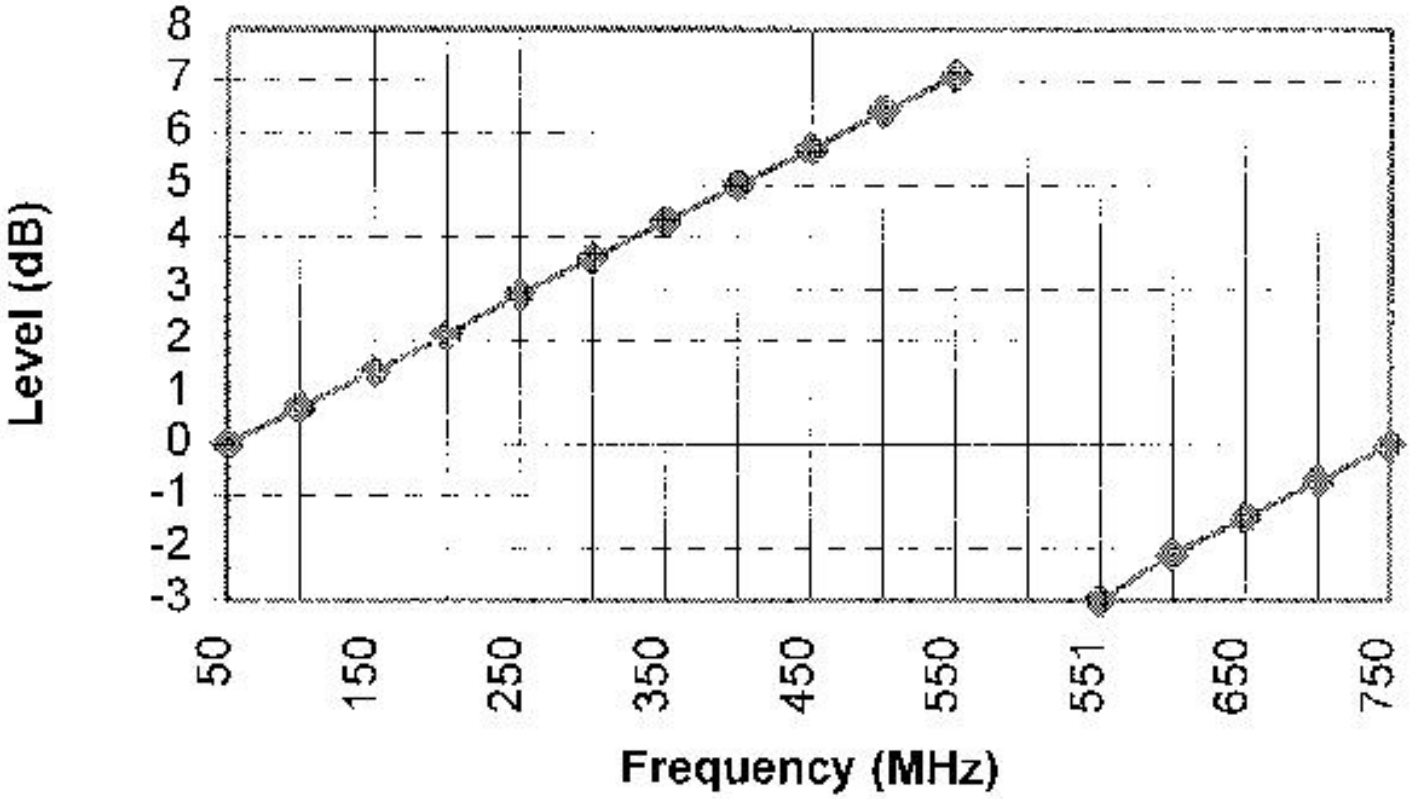
- DC current of the forward and return amplifiers
- AC and DC voltage
- Temperature
- ADU drive voltage
- Tamper status

The LL-BTA-52/5.5 uses 52 and 5.5 MHz for the downstream and upstream communication frequencies, respectively. The LL-BTA-52/5.5 requires only mechanical installation into the BTD-75. the parametric limits for alarms and operational levels of the LL-BTA-52/5.5 are set from the LIFELINE software control console.

Slope Chart S1



Slope Chart S2



1. Operating passband of station. Diplex filters are hard-wired into the electronic chassis.

2. Peak-to-valley measurement for stated passband. Highest to lowest point on response curve.

3. Minimum full gain at 750 MHz, includes loss of equalizer but Bode slope reserves have not been set. Minimum and typical specifications are supplied. Return gain includes loss of SEE-40-7 return equalizer.

4. Operational gain includes loss of slope reserves as well as equalizer. This should be considered maximum station spacing.

5. Amount of Bode slope control range from midpoint, (typical setting is -4 dB @ 750 MHz @ 21°C). This control should not be used for station gain reduction.

6. Amount of slope created by interstage equalizer. Interstage equalizer is a plug-in.

7. Noise figure is specified at the cable entry facility of the housing and includes the loss of 1 dB for the pre-stage equalizer. The 40 MHz return noise figure includes the loss of the combining network preceding the RF hybrid.

8. Frequencies that relate the picture carriers or passband edges to the specified output levels and tilts. Refer to charts S1 or S2 as required.

9. Measured with CW carriers and spectrum analyzer. References the worst case channel over the specified Ambient Operating Temperature. Specifications are compliant with the test methods as stated in NCTA recommended practices for measurements on cable television systems.

10. Measured with wave analyzer and synchronous, 100%-depth modulated channels. References the worst case channel over the specified Ambient Operating Temperature. Specifications are compliant with the test methods as stated in NCTA recommended practices for measurements on cable television systems.

11. Composite Second Order distortion refers only to those beat clusters that fall +0.75 MHz and +1.25 MHz above the subject picture carrier. CSO beat clusters that have a -0.75 MHz and -1.25 MHz relationship to the subject picture carrier are not included in this specification.

12. CIN (Carrier-to-Intermodulation Noise). Contributions of data compression to noise floor. Performance varies on a two-for-one basis with amplifier output level and should be calculated in a cascade using a 20 Log function, but CIN should be added to the high channel C/N calculation on a 10 Log basis.

13. Test points should be used with a GFAL adaptor.

14. Match measurement at the station input and output, cable-entry facilities, at the specified passbands.

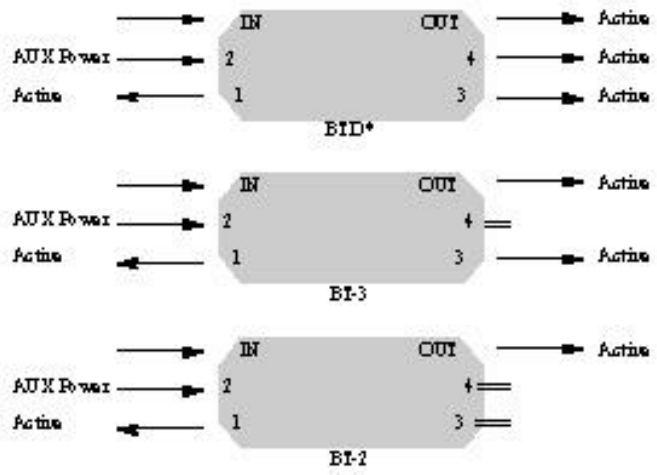
15. Measured with the stated AC Bypass Current.

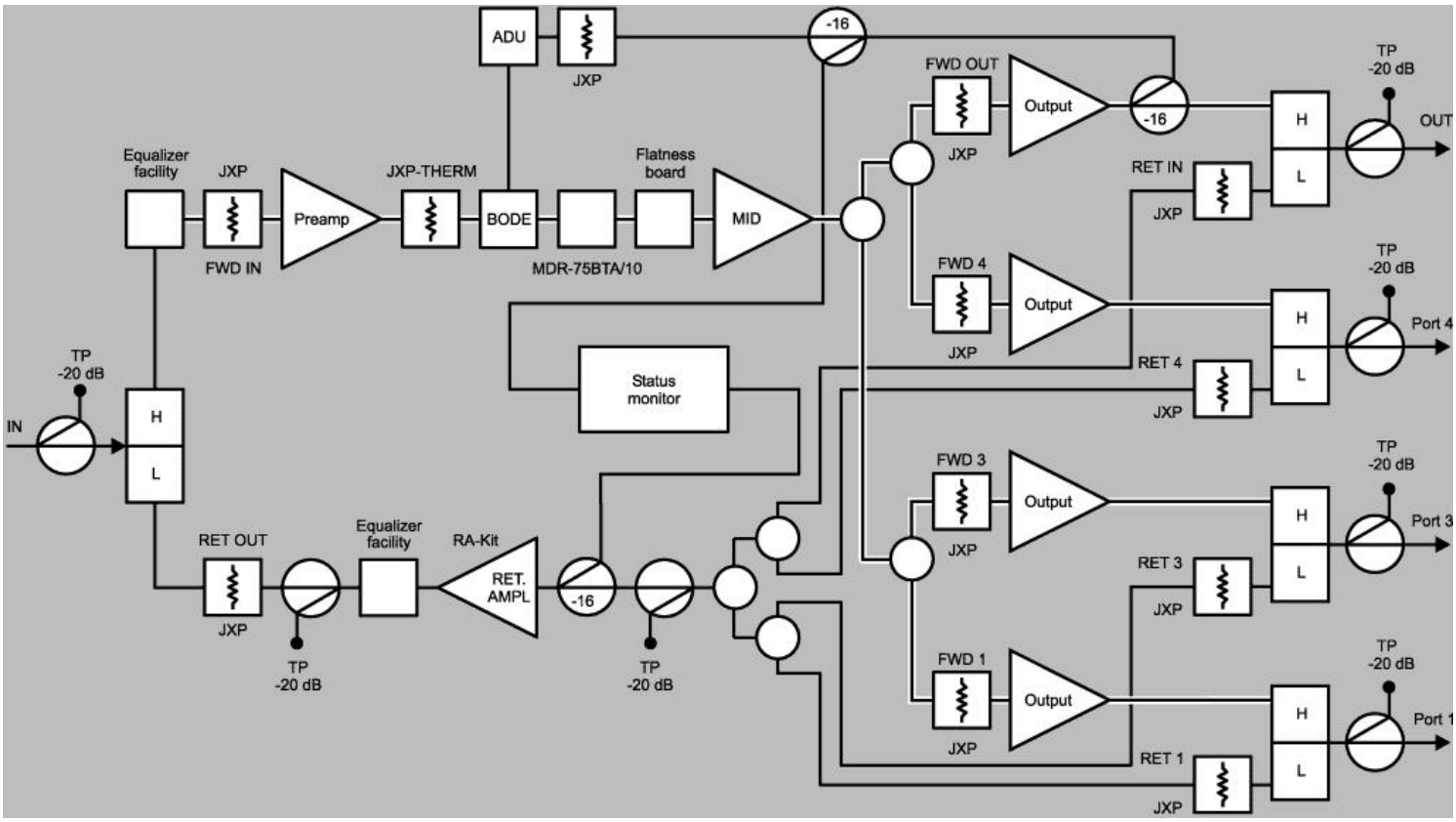
16. Measured at the power connector.

17. Current draw at +24.0 Vdc.

18. AC current is stated in RMS continuous.

19. Group Delay is specified for standard NTSC video, where delay is the delta from picture carrier to 3.58 MHz color subcarrier.





Return path insertion losses:

Loss from cable-entry connector to input of RF hybrid through combining network (any port) = -9 dB.

Loss from output of RF hybrid to cable-entry connector, excluding return equalizer = -2 dB.

Ordering Information:

QTY	Model Number	Description
1	BTD-75**	Basic station, forward electronic chassis, power supply and housing.
1	EQ-750-**	Forward, pre-stage equalizer, 750 MHz, ** specify cable equivalent equalization, 2-22 dB, in 2 dB steps. Consult system design for values.
A/R	JXP-A	Attenuation pads, available from 1 to 15 dB in 1 dB steps. 5 locations forward path. 5 locations return path. Consult system design for values.
1 optional	ADU-499.25	Automatic Drive Unit, single-channel, closed-loop control circuit for ASC operation.
1 optional	TDU	Thermal Drive Unit, thermistor driven control circuit for thermally guided slope control.

5 optional	BCB-5S	5-Ampere thermal circuit breaker for AC bypass. BTD-75 is shipped standard with 10-Ampere automotive fuses (style SAE J1284).
1 optional	RA-KIT/*H	Return amplifier kit, contains RF hybrid, jumpers, and equalizer.
1 optional	FTEC-BTA	Electronic crowbar circuit, plug-in, for lightning strikes. BTD-75 is shipped with high current surge arrestor that fires at 230 Volts.

Powering, sum each column for the amplified and options selected

	I DC @ +24 V mA	DC Power W	AC Power W	90 Vac	80 Vac	70 Vac	60 Vac	52 Vac	44 Vac	38 Vac
BT-75**	2210	53.04	67.14	0.78	0.87	1.0	1.16	1.34	1.59	1.84
ADU-***	70	1.68	2.13	0.02	0.03	0.03	0.04	0.04	0.05	0.05
TDU	10	0.24	0.30	0.01	0.01	0.01	0.01	0.01	0.01	0.01
RA-KIT/*H	135	3.24	4.10	0.04	0.06	0.06	0.07	0.08	0.09	0.11
LL-BTA-**	100	2.40	3.04	0.03	0.04	0.04	0.05	0.06	0.07	0.08

Specifications

Amplifiers Broadband Telecommunications 4 Port, Parallel Hybrid Amplifier[BTD-75]**

BTD-75**

						Optional RA/ KIT40H Installed
PARAMETER		**UNITS**	**NOTE**	**FORWARD**		**RETURN**
Passband						
	SH	MHz	1	52-750		5-40
	JH	MHz	1	70-750		5-55
Flatness		dB	2	±0.75		±0.75
Minimum Full Gain		dB	3	39 Min. / 41 Typ.		17
Operational Gain		dB	4	35 Min. / 37 Typ.		17
Manual Bode Slope Control Range		dB	5	±4		NA
Interstage Equalizer:	Slope	dB	6	10 ±1	N/A	N/A
	Cable Equivalent	dB		13 ±1.3	N/A	N/A
Noise Figure	40 MHz	dB	7	N/A		14

	52 MHz	dB		10		N/A
	750 MHz	dB		10		N/A
Reference Frequency		MHz	8	745.25/55.25	750/547.25/55.25	
Output Level		dBmV		47/37	37/44/37	
Channel loading				110 NTSC	77 NTSC with 200 MHz compressed data	
Slope Chart				**S1**	**S2**	
Distortion	CTB	dBc	9	58	67	N/A
	XM	dBc	10	58	66	N/A
	CSO	dBc	9, 11	57	68	N/A
	CIN	dBc	12	N/A	69	N/A
	STB	dBc	9	N/A	N/A	N/A
	SSO	dBc	9	N/A	N/A	N/A
Test Point (all)		dB	13	20 ±1	20±1	20 ±1
Return Loss		dB	14	14	14	
Hum Modulation		dBc	15	65	65	65
B+		Vdc	16	+24.3 ±0.25	+24.3 ±0.25	+24.3 ±0.25
Current DC		mA	17	2210	2210	135
DC Ripple		mV		15 P-P	15 P-P	15 P-P
Power Consumption		W		67.1	67.1	4.1
AC Input Voltage Range	Vac			38-60	38-60	38-60
AC Current Draw:	@ 90 Vac	A		0.78	0.78	0.82
	@ 80 Vac	A		0.87	0.87	0.93
	@ 60 Vac	A		1.16	1.16	1.23
	@ 52 Vac	A		1.34	1.34	1.42
	@ 44 Vac	A		1.59	1.59	1.68
	@ 38 Vac	A		1.84	1.84	1.94
AC Bypass Current	Port 2	A	18	12	12	12
	All Other Ports	A	19	10	10	10
Group Delay, Typical						
	Channel 2 (HRC)	nSec		20 (28)	20 (28)	N/A
	Channel 3	nSec		9	9	N/A

	Channel 4	nSec		5	5	N/A
	Channel 5 or >	nSec		2 or <	2 or <	N/A
	Channel T11	nSec		N/A	N/A	20
	Channel T10	nSec		N/A	N/A	10
Refer to chart GD-1 for 1 MHz Increment return band delays						
Housing = BTA-SXHG Dimensions			L = 21.6" (54.65 cm)	W = 10.6" (26.82 cm)	D = 8.1" (20.49 cm)	
Weight			Weight = 27 lbs. (12.15 kgs)			
Ambient Operating Temperature			-40° to +60° C			

BT2-75SH, BT3-75SH Specifications

PARAMETER		**UNITS**	**NOTE**	**BT2-75SH**	**BT3-75SH**	**RETURN**
Passband		MHz	1	52-750	52-750	5-40
Flatness		dB	2	±0.75	±0.75	±0.75
Minimum Full Gain		dB	3	39 Min. /41 Typ.	39 Min. /41 Typ.	17
Operational Gain		dB	4	35 Min. / 37 Typ.	35 Min. /37 Typ.	17
Manual Bode Slope Control Range		dB	5	±4	±4	N/A
Interstage Equalizer:	Slope	dB	6	10 ±1	10 ±1	N/A
	Cable Equivalent	dB		13 ±1.3	13 ±1.3	N/A
Noise Figure:	40 MHz	dB	7	N/A	N/A	14
	52 MHz	dB		10	10	N/A
	750 MHz	dB		10	10	N/A
Reference Frequency:		MHz	8	745.25/55.25	750/547.25/55.25	31
	Output Level			47/37	37/44/37	41 Flat
	Channel loading			110 NTSC	77 NTSC with 200 MHz compressed data	4 NTSC
Slope Chart				**S1**	**S2**	
Distortion	CTB	dBc	9	58	67	N/A
	XM	dBc	10	58	66	69

	CSO	dBc	9, 11	57	68	N/A
	CIN	dBc	12	N/A	69	N/A
	STB	dBc	9	N/A	N/A	78
	SSO	dBc	9	N/A	N/A	76
Test Point (all)		dB	13	20 ±1.0	20 ±1.0	20 ±1.0
Return Loss (Min.)		dB	14	14	14	16
Hum Modulation		dBc	15	65	65	65
DC Voltage		Vdc	16	+24.3 ±0.25	+24.3 ±0.25	+24.3 ±0.25
Current DC		mA	17	1340	1775	135
DC Ripple		mV		15 P-P	15 P-P	15 P-P
Power Consumption		W		40.20	53.25	4.1
AC Input Voltage Range		Vac		38-90	38-90	38-90
AC Current Draw	@ 90 Vac	A	18	0.47	0.62	0.05
	@ 80 Vac	A		0.53	0.70	0.05
	@ 60 Vac	A		0.71	0.93	0.08
	@ 52 Vac	A		0.81	1.08	0.08
	@ 44 Vac	A		0.96	1.27	0.10
	@ 38 Vac	A		1.11	1.48	0.11
AC Bypass Current	Port 2	A	18	12	12	12
	All Other Ports	A	19	10	10	10
Group Delay, Typical						
	Channel 2 (HRC)	nSec		20 (28)	20 (28)	N/A
	Channel 3	nSec		9	9	N/A
	Channel 4	nSec		5	5	N/A
	Channel 5 or >	nSec		2 or <	2 or <	N/A
	Channel T11	nSec		N/A	N/A	20
	Channel T10	nSec		N/A	N/A	10
Housing Dimensions			21.6" L x 10.6" W x 20.6" D (54.9 cm) x (26.9 cm) x (20.6 cm)			
Weight			27 lbs. (12.15 kgs)			
Ambient Operating Temperature			-40° to +60° C			

Specifications subject to change without notice.

For more information: call 1-888-436-4678