TBLE-1220 Series CATV Distribution Amplifiers

Model	Bandwidth
TBLE-1220-35	5-42 MHz / 54-1220 MHz 5-85 MHz / 102-1220 MHz 5-204 MHz / 258-1220 MHz

TBLE1220 series CATV Line Extenders are broadband outdoor, with GaAs- Hybrid/ Power-Doubler technology designed for the cable powered (30-90VAC) distribution systems where a high quality low noise figure amplifier is necessary to amplify the signals in both the forward and return paths.

These are all designed with flat operational gain of 35 dB in the forward bandwidth and 25 dB in the reverse bandwidth with a plug-in R/A module. They have an input plug-in fixed attenuator and equalizer with plug-in inter-stage equalization feature in the forward bandwidth, a post stage plug-in equalization feature in the reverse bandwidth.

Reverse bandwidth features a fixed value attenuator pad at the input and at the output stages.

The unique design allows for seamless upgrade configurations from 85/102 and 204/258 by simply exchanging plug-in diplex filter sets, thereby future-proofing upstream bandwidth requirements.

These amplifiers are remote powered, 30-90 VAC over coaxial network.

FEATURES

Fully meets the requirements of DOCSIS 3.1, system split

Downstream frequency bandwidth extends to 1220 MHz,

Multiple diplex filter frequency split options,

GaAs-FET Push Pull for high output levels with low distortions,

JXP style plug-in Pads and JXPEQ Plug in Equalizers

RFI housing,

SCTE compliant F type connectors,

Surge protection on all ports,

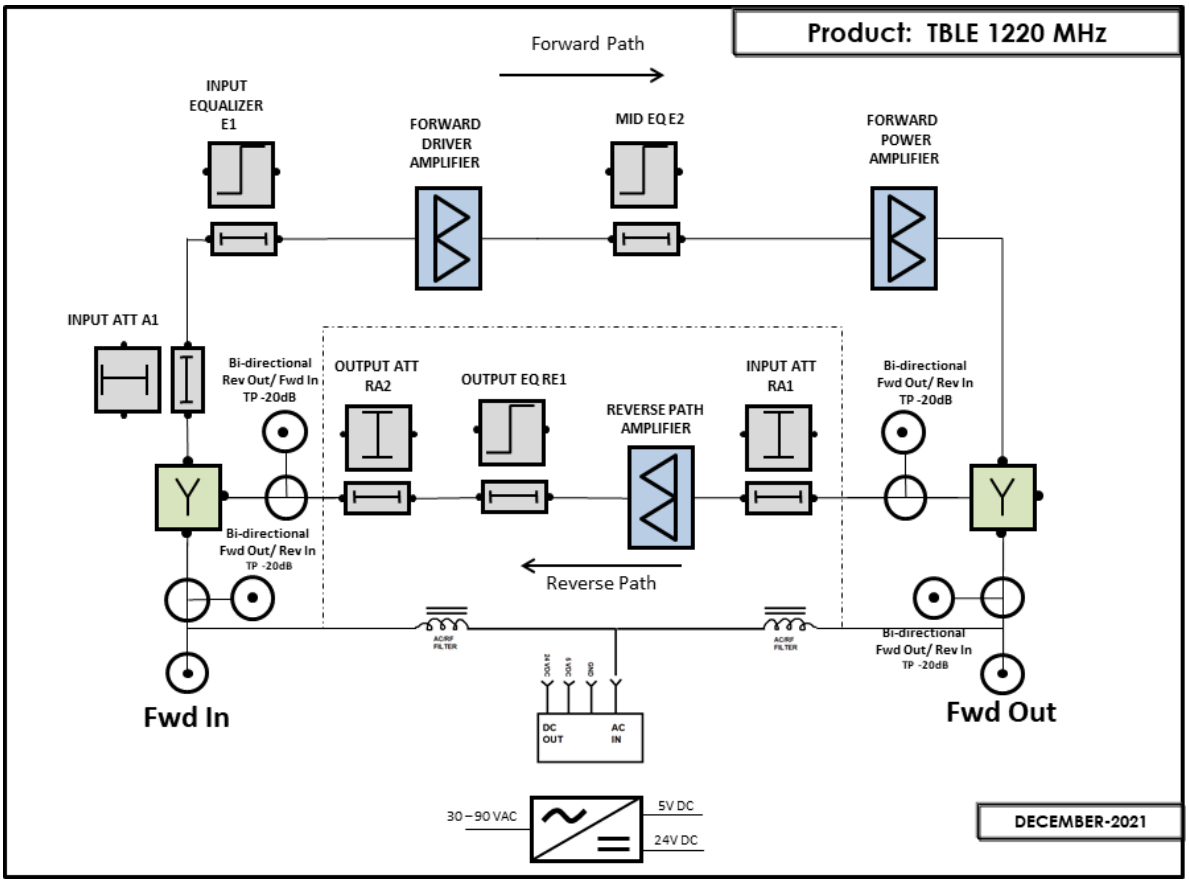
Diecast aluminum housing for heat dissipation.

Field-replaceable filter kits with multiple diplex filter frequency split options offer seamless upgrade

SPECIFICATIONS

Parameter	Notes	Forward GaAs-FET Push Pull	Reverse	Units
Bandwidth		54/102/258 to 1220	5 to 42/85/204	MHz
Min Full Gain		35	25	dB
Flatness		+/-1.2	+/-1	dB
Return Loss, IN / OUT		-16	-16	dB
RF Test Points	IN / OUT	-20	-20	dB
Gain Control, variable		0-20 (input)	0-20 (output)	dB
Slope Control, variable		0-20 (input)	---	dB
Fixed Equalizers		0 to 26 with 2dB steps (midstage)	---	dB
Forward Distortions, 79 channels:	42dBmV Flat Output			
CTB	on ch78	-63	---	dBc
CSO	on ch78	-66	---	dBc
Xmod	on ch2	-60	---	dBc
Forward Distortions, 79 channels:	12dB interstage slope (54-1000 MHz),ref 32/44dBmV			
CTB	on ch78	-67	---	dBc
CSO	on ch78	-70	---	dBc
Xmod	on ch2	-63	---	dBc
Reverse Distortions, 4 ch	52dBmV flat output			
3rd on T10	T8+T9-T7	---	-68	dBc
2nd on T9	T7+12MHz	---	-65	dBc
Xmod on T10	T7, T8, T9, T10	---	-64	dBc
Noise Figure		7	7	dB
Fwd Group Delay:	55.25-58.83MHz	max.35	---	nsec
Rev Group Delay:	41-42MHz	---	max .30	nsec
Hum Modulation		-70	dB	
RFI Isolation	5-1000MHz	-100	dB	
Surge Withstand	IN / OUT	IEEE C62.41-1991 Category B3, Combination Wave 6KV, 3KA		
AC Input	Only from Input	30-90	VAC	
Power Consumption		8.0	Watts	
Temperature		-40 to 130° F (-40 to +55° C)		
Environmental Protection		Painted housing with stainless bushings & hardware		
Weight		1.6 kgs / 3.6 lbs		
Water Immersion		15psi for 10 seconds @ 20degC		

BLOCK DIAGRAM



The Lightning flash with arrowhead symbol within an equilateral triangle is intended to alert you to the presence of uninsulated " dangerous voltage " within the products supplementary external power supply enclosure that may be of sufficient magnitude to constitute a risk of electrical shock to persons.

CAUTION

Risk of Electric Shock
Do not Open

The exclamation point within an equilateral triangle is intended to alert you to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

REMEMBER TO REPLACE COVER AFTER ADJUSTING. COVER MUST BE IN PLACE FOR CE, SAFETY AND PROTECTION.

NO SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

WARNING: TO PREVENT SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.
THIS APPARATUS SHALL NOT BE EXPOSED TO DRIPPING OR SPLASHING WATER AND NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHALL BE PLACED ON THE APPARATUS.
WARNING: THIS PRODUCT IS A CLASS-I CONSTRUCTION. PLEASE ENSURE A CONNECTION TO POWER SOURCE INCLUDES A PROTECTIVE EARTHING CONNECTION.

Basic Setup Procedure

Forward Level Setup:

Remember that the ideal input level to the amplifier is about 3 dB above the Noise Figure of the amplifier so ideally the input level will be about 10 dB

1. Before applying power to the amplifier make sure that the input level to the amplifier is not too high, or damage to the amplifier might occur. To be on the safe side, installing highest available value input pad is recommended (such as a JXP-20 Pad) before powering the amplifier.
2. Before applying power to the amplifier, make sure that output connector is terminated (75 Ω load)
3. Install a 0dB input equalizer for minimum slope and install a 0dB plug in equalizer into the mid- stage equalizer socket (this should be already installed by the factory when delivered)
4. Now apply power to the amplifier and measure the amplifier output level at the 20dB output test point. If the measurement is very low, then replace the 20 dB input pad with a lower value to increase the output level as necessary to obtain desired output level at the highest operating frequency. Remember that the level measured at the test point is 20dB lower than the actual signal level at the output port.
5. Adjust the input equalizer value (using a JXPEQ-*) until the output level is flat across the full bandwidth. This will result in a flat input level to the first amplifier stage.
6. This will result in best CNR across the full bandwidth.
7. Now install a plug-in equalizer into the mid-stage equalizer socket to get as close as possible to the desired output signal slope. The desired slope is determined by your system design. Consult your system planner or your system maps for this information.
8. Make a final adjustment of the output slope and output level with the input attenuator and equalizer values. Always adjust the gain control, then the slope control in that order.
9. If you are having trouble obtaining the expected output levels, check the input test point to verify that the levels are as expected at the input of the amplifier.
10. Record the in/out operating levels and mid equalizer option used in this station on the lid label and proceed to the reverse band level setup.

Reverse Level Setup:

1. If the forward amplifier is not set up, stop and do it now. It is recommended that the forward amplifier be set up first since its high gain requires extra precautions be taken before powering.
2. A commercially available reverse sweep and balance test system is recommended for setting up the TBLE reverse amplifier. With this test system the forward output test point will be used for a reverse signal injection point, and you should start your set up at the first amplifier out from the node. Follow the procedure offered in the test system manual.
3. If you don't have a reverse sweep and balance test system, you will need two people to set up the reverse band, and they will need to communicate with each other.
4. The procedure is simply explained as follows:
    a. Reverse signals are all combining to arrive at the node destination. Therefore, the signals should be set up to have constant levels at each reverse amplifier input.
    b. Constant input signal levels are achieved by injecting an (X) dBmV test signal into the reverse input using the forward output 20dB test point. Adjust the reverse amplifier output gain and slope controls to achieve the same (X) dBmV input signal level at the following amplifier (or node) input. The person at the node reports the resulting levels to the person injecting and adjusting. This gives a unity gain setup for each reverse span.
    c. The person at the node does not have to move to the adjacent amp each time the setup person moves to the next amp. This is because the system is being set up for unity gain.
    d. Remember that the reverse test points and the injection point are 20dB directional couplers, so your measured levels and injected levels should be accordingly adjusted.

About Filter Kits Replacement

- After cutting the power of the device and replacing the diplexer modules, repeat the "Basic Setup Procedure"
- If the power of the device cannot be cut off, first unplug the power socket of the device, then replace the diplexers and repeat the "Basic Setup Procedure" as needs.

Optional Diplex Filter Kits and plug in Pads and EQ's	
Part	**Description**
TBLE-DPX42/54 Diplex Filter set (Stock)	5-42/54-1220 MHz (Stock from factory)
TBLE-DPX85/102 Diplex Filter set	Filter kit consisting of two diplex filter modules & one return EQ JXP for 204/258 MHz frequency range
TBLE-DPX204/258 Diplex Filter set	Filter kit consisting of two diplex filter modules & one return EQ JXP for 204/258 MHz frequency range
JXP-* (replace the * with a value for the attenuator pad)	0 to 20 dB Pad in 1 dB steps
JXPEQ-* (replace the * with a value for the equalizer)	0 to 20 dB EQ in 1 dB steps

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