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Q-SERIES® Power

BAQ-UP™ (QRED) Redundancy Switch with Backup Amplifier

INSTALLATION & OPERATION MANUAL

TABLE OF CONTENTS

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DESCRIPTION OF INTERFACES

1. Description of Interfaces

BAQ-UP™ Front View

The BAQ-UP™ system (the system) has three compartments: the amplifier compartment, the power supply compartment, and the RF switch compartment.

Power Supply Compartment: (Located in the center portion of the chassis)

a) **Rear:** 24 VAC Input
24 VDC Input

b) **Front:** Green LED: 24V power on

Description: Both the 24 VAC and the 24 VDC can be connected at the same time to their designated terminal strips. A diode "OR circuit" is located internally to select the source with the highest voltage. This allows you to provide redundant power to this device by simultaneously connecting the 110 VAC / 24 VAC supplied transformer to the AC terminals when you also have connected a 24 VDC source to the DC terminals. The green LED on the front indicates proper power supply operation.

RF Amplifier Compartment: (Right side of chassis facing back)

a) **Rear:** Input (located immediately to the right of the AC/DC terminal block)
Output (located at the extreme right of the chassis)

b) **Front:** (with cover removed):
Input Test Point
Output Test Point
Gain Control
Slope Control
Input Pad (used to optimize the input to the amplifier)

Description: This is referred to as the secondary amplifier because your existing amplifier is referred to as the primary amplifier. This internal amplifier has a low-noise front-end and is comparable in signal quality to any primary amplifier.

RF Switch Compartment: (Left side of chassis facing back)

a) **Rear:** Main Signal Input (located immediately left of AC/DC terminal block)
Output to Primary Amp
Output to Secondary Amp
Input from Primary Amp
Input from Secondary Amp
Main Output (on extreme left side facing back of chassis)

Description: If you are connecting this amp/switch as a redundant amp for your existing amplifier, then move the input from your existing amplifier to the main signal input connector for this device. Connect a cable from the "Out to Primary" connector to the input of your existing amplifier. Move the output of your existing amplifier to the "In from Primary" connector. Connect a cable from "Out to Secondary" to the secondary amplifier input located immediately to the right of the 24 VDC / 24 VAC terminal connectors. Connect another cable from "In from Secondary" to the secondary amplifier output located to the extreme right of the chassis as you are facing the rear of the chassis.

Alarms:

Alarm 1 (form C) for the primary amp

Alarm 2 (form C) for the secondary amp

Switch:

Remote control switch contacts

Description: The form C contacts may be used to switch any warning device that can provide a notification in case either amplifier has failed. The remote switch contacts may be used to force a switch from the primary to the secondary amplifier.

b) **Front:** (with cover removed):

Green LED: — 5V power on

Yellow LED (warning):

- On: using reference levels stored in EEPROM
- Flashing (1/sec): Needs to set reference levels
- Flashing (3/sec): Switched to the secondary amplifier by the remote control switch

Red LED (alarm):

- On: Primary amp failure
- Flashing (1/sec): Secondary amp failure
- Flashing (3/sec): Input signal low/primary amp and secondary amp failure

RF Detectors:

- Primary Amp RF Level Detector: DC level proportional to the primary amp RF output level
- Secondary Amp RF Level Detector: DC level proportional to the secondary amp RF output level

Test Points:

- Primary Amp DC Level
- Secondary Amp DC Level

Switches:

- Controller Reset: Restarts the microcontroller program
- Set Ref Levels: Stores the levels as references and start monitoring the amps

DESCRIPTION OF OPERATION

2. Description of Operation

RF output levels of both the primary and the secondary amplifiers are sampled and this sample is converted to a voltage value. At initial power on, the system is switched to run on the primary amp. The yellow LED will flash slowly indicating the reference levels need to be set. By pressing the “Set Reference Levels” switch, the microcontroller samples the output values of both the primary amp and the secondary amp and stores the values as references. These values will be used to compare with the sampled output values of both amplifiers to confirm proper levels. At any time during the operation, one can always press the “Controller Reset” switch to reset the microcontroller program and store the new sampled values.

The remote control switch is activated by closing the remote control contacts. Activation (closing the contacts) effects a switch to the secondary amplifier. Removing the contact closure will cause a switch back to the primary amplifier. When the system is switched to the secondary amp, the yellow LED will flash quickly to warn the user. The remote control switch can change the system back and forth from the primary amp to the secondary amp by opening/closing the remote control contacts. The system detects the remote control switch periodically to check its state. If a change in status is detected on the remote control switch, the system will set to the primary or secondary amp according to the state of the contact closure.

During normal operation, if both outputs are within 3 dB (factory programmable) of the reference values, no action will be taken. If the primary amp is down 3 dB or more and the secondary amp is not, the system considers the primary amp failed and will switch to the secondary amp, set Alarm 1, and set the red LED on. The system needs to be reset (by the controller reset push buttom on the front of the unit) at this point to get back to normal operation (after correcting the levels of the primary amplifier).

If both outputs are down 3 dB or more, the system considers the input is low and will set the red LED flashing quickly and set the alarms. The system needs to be reset at this point to get back to normal operation (after correcting the input levels).

If the system is running on the primary amp and the secondary amp level is down 3 dB or more, the system considers the secondary amp failed and will set Alarm 2 and set the red LED flashing slowly. The system should be reset at this point to get back to normal operation (after making corrections to the secondary amp).

If the primary amp has failed and the microcontroller has switched to the secondary amp, the microcontroller can not perform any additional switches because the detectors are unable to sample any signal when the secondary amplifier is activated. The system needs to be reset at this point to get back to normal operation (after correcting the primary amplifier signal level). The remote control switch is non-functional in this situation since a switch can not be forced to a failed primary amplifier.

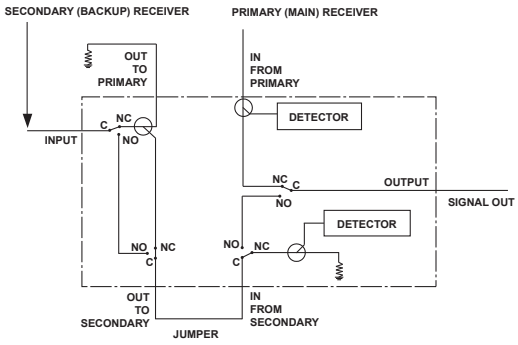
The total power within the bandwidth from the primary amplifier coming into the RF switch compartment should not exceed 50 dBmV per channel. If only a portion of the TV channels is used, the maximum signal level per channel could be higher than 50 dBmV and the minimum signal level should be higher than 20 dBmV.

The recommended primary amplifier output level is between 20 dBmV and 50 dBmV with all the TV channels loaded within the passband. The secondary amplifier operates 20 dB lower than the primary amplifier during normal operation.

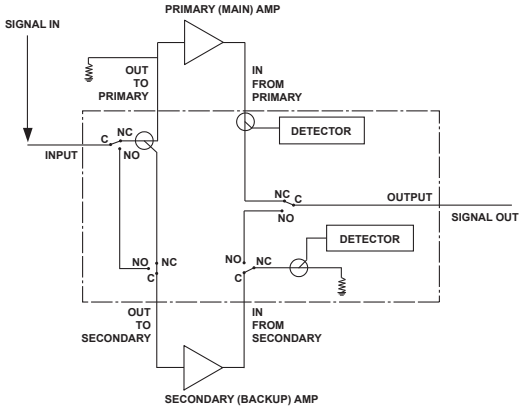
The system also stores the reference levels to the EEPROM on the microcontroller. When a power outage occurs, the system can retrieve the reference levels from the EEPROM after the power comes back on. After power on, the system waits for three minutes for the user to press the “Set Reference Levels” switch and will retrieve the levels from EEPROM if the switch is not pressed. The system will also warn the user with a steady yellow LED light when it’s using the retrieved reference levels. The user can press “Controller Reset” switch and then press the “Set Reference Levels” switch to overwrite the retrieved levels. Please notice that when the user first gets the system, there are reference levels stored into the EEPROM while the system was tested in the factory.

During normal operation, Alarm 1 and Alarm 2 are energized (i.e. the Normally Open contact is connected to the Common contact). This configuration ensures that the user be alerted when power goes down.

2.1 Functional Schematic



This wiring configuration is for a hub site with a primary input and a backup input. In addition to the wiring method, the microprocessor is programmed at ATX to switch to the secondary input when the primary input falls below the threshhold level. When the primary level is restored within normal range, the QRED will switch back to the primary input immediately. This is an advantage in unmanned hub sites in that no level resetting is required after a primary path failure.



This wiring configuration is for a headend site with an amplifier that needs backup protection. This typically is used in the signal path where an amplifier failure is not acceptable. The QRED switch is programmed to switch to the secondary amplifier when the cumulative RF output of the primary amplifier falls below a programmed level, usually a 3 dB drop. This output is measured within a frequency range from 120-220 MHz. The microprocessor controlled switch can be programmed to switch within the end users specifications for timing and RF levels. Once a switch is made to the secondary amplifier, the signal path continues through the secondary amplifier until a technician restores the primary amplifier signal levels and resets the switch manually.

SET-UP PROCEDURE

3. Set-up Procedure

1. Remove the cover.
2. Connect input signal to the “Input” of the RF switch compartment.
3. Connect the “Output to Secondary Amp” of the RF switch compartment to the “Input” of the amplifier compartment.
4. Connect the “Output” of the amplifier compartment to the “Input from Secondary Amp” of the RF switch compartment.
5. Connect the “Output to Primary Amp” of the RF switch compartment to the “Input” of an external amplifier.
6. Connect the “Output” of the external amplifier to the “Input from Primary Amp” of the RF switch compartment.
7. Connect signal strength meter to the “Output” of the RF switch compartment.
8. Adjust the external amplifier to get the desired level.
9. Connect 24 VDC or 24 VAC to the appropriate input of the power supply compartment.
10. Push the “Set Ref. Levels” switch.
11. Connect the “+” and “-” contact of the remote switch with a jumper to force the microcontroller switch to the secondary amplifier.
12. Adjust the gain and slope control in the amplifier compartment to get desired signal level.
13. Remove the jumper from the remote switch.
14. Remove the signal strength meter from the “Output” of the RF switch compartment.
15. Connect the “Output” of the RF switch compartment to the desired output cable.
16. Use a voltmeter to measure the DC voltage on the “Secondary Amp DC Level” test point. Adjust the variable attenuator on the secondary amp level detector to get the voltage to a nominal 2.5V if possible. (For lower RF levels, the detected DC voltage may not reach 2.5 VDC. This is normal).
17. Use the voltmeter to measure the DC voltage on the “Primary Amp DC Level” test point. Adjust the variable attenuator on the primary amp level detector to get the voltage close to the voltage on the “Secondary Amp DC Level” test point.
18. Put the cover back on.
19. Press “Controller Reset”.
20. Press “Set Ref Levels”.

SET UP PROCEDURE IS COMPLETE

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SPECIFICATIONS

4. Specifications

SPECIFICATIONS		870 MHz		1000 MHz	
BAQ-UP™					
BANDWIDTH		40-870 MHz		40-1000 MHz	
RESPONSE		+/- .5 dB			
CHANNEL LOADING		128			
GAIN CONTROL RANGE		8 dB			
SLOPE CONTROL RANGE		6 dB			
TECHNOLOGY		GaAs PD	CGP	GaAs PD	CGP
GAINS AVAILABLE (dB)		30, 34	33	30, 34	33
OUTPUT LEVEL		43 dBmV	43 dBmV	43 dBmV	43 dBmV
RETURN LOSS		17 dB	17 dB	17 dB	17 dB
NOISE FIGURE (dB)		5.0, 4.5	4.5	5.0, 4.5	4.5
DISTORTIONS	COMP. TR. BT. (-dB)	66	68	66	68
	COMP. 2nd ORD. (-dB)	67	68	67	68
POWER (Watts) (24 DC, 120 VAC)		17, 26	21, 32.5	17, 26	21, 32.5
SWITCH					
SWITCHING TIME		100mS Default Delay -- Contact ATX for Different Delay Times			
ISOLATION		50 dB			
INSERTION LOSS (Main Path)		2 dB max. (1 dB on the input and 1 dB on the output)			
RETURN LOSS		18 dB min.			
RF SENSITIVITY RANGE		+20 dBmV to +50 dBmV Amplifier Output Monitoring			
POWER DISSIPATION		6.3 Watts Normal Mode, 8.5 Watts in Backup Mode			
ENVIRONMENTAL & PHYSICAL PARAMETERS					
OPERATING TEMPERATURE		0^0C to +50^0C (+32^0F to +122^0F)			
HUMIDITY		20%-55% (without condensation)			
DIMENSIONS		1.75”H x 19.0”W x 5.0”D (4.45H x 48.26W x 12.7D cm)			
WEIGHT		8.0 lbs (3.6 kg)			

NOTE:
Flat Output levels with full analog channel loading are specified on all models. Adjustments may be made due to channel loading or levels. Contact ATX for details.

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SERVICE & SUPPORT

5. Service & Support

5.1 Contact ATX Networks

Please contact ATX Technical Support for assistance with any ATX products. Please contact ATX Customer Service to obtain a valid RMA number for any ATX products that require service and are in or out-of-warranty before returning a failed module to the factory.

RF Products
(MAXNET, SignalOn, HFC Enhance, PCI Filters, Q-Series, SCN, SMAC, FiberLinx)

TECHNICAL SUPPORT
Tel: (905) 428-6068 – press *3 then press 2
Toll Free: (800) 565-7488 – press *3 then press 2 (USA & Canada only)
Email: rfsupport@atxnetworks.com

CUSTOMER SERVICE
ATX Networks
1-501 Clements Road West
Ajax, ON L1S 7H4 Canada

Tel: (905) 428-6068 – press *1
Toll Free: (800) 565-7488 – press *1 (USA & Canada only)
Fax: (905) 427-1964
Toll Free Fax: (866) 427-1964 (USA & Canada only)
Email: support@atxnetworks.com
Web: www.atxnetworks.com

5.2 Warranty Information

All of ATX Networks' products have a 1-year warranty that covers manufacturer's defects or failures.

ISO
9001:15
REGISTERED

Rev. 07/18 (ANW0849)

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