

Technical Practice

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BP-2 POWER FAILURE TRANSFER UNIT

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1. General Description

1.1 NEW PRACTICE ISSUE Issue 1 of the BP-2 Technical Practice 40113 is released due to improvements in the BP-2 that simplify installation and increase compatibility. BP-2-24's with serial number BP-2-24-17500 or higher and BP-2-48's with serial number BP-2-48-3400 or higher contain these improvements. These units are easily identified as their circuit boards are blue in color; previous BP-2 circuit boards have been green in color. Improvements include reducing the number of jumper straps and eliminating fuses. Also, there is increased compatibility between the BP-2 and PBX systems that provide message waiting indication using 500/2500-type telephone sets, and between the BP-2 and telephone company Central Offices that provide reverse battery answer supervision.

1.2 PRODUCT OVERVIEW The BP-2 Power Failure Transfer (PFT) Unit is designed to connect 2-wire Central Office (CO) ground start trunk lines to selected station telephones in the event of a power failure or telecommunications system malfunction. The BP-2 contains automatic loop start to ground start conversion circuitry to provide the signaling required to draw CO dial tone when a station telephone is brought off-hook; this eliminates the need to add ground start push buttons to the station telephones. In the non-PFT mode of operation, the BP-2 connects the CO ground start trunk lines to trunk ports on the PBX system; PBX ex-tension ports are connected to station telephones.

1.3 FEATURES Features include eight circuits of PFT, LED status indicators, manual PFT switch, provision for a normally open contact or logic level signal to activate the PFT mode, two auxiliary relay contacts, and provision for additional BP-2's to be connected in a master/slave configuration.

1.4 POWER REQUIREMENTS The BP-2 is manufactured in two versions. The BP-2-24 is designed to operate with an AC or DC

power source; 24Vac or -24Vdc, 225mA maximum is required. The BP-2-48 requires -48Vdc, 140mA maximum for operation.

1.5 DESCRIPTION The BP-2 consists of a precision fabricated printed circuit board, and an injection-molded housing consisting of a base and detachable cover. The thermoplastic material used for the housing conforms to industry recognized flame-retardant standards. The BP-2 measures 8.75 inches (22.2cm) square, 3.25 inches (8.3cm) deep, and weighs approximately two pounds (0.9kg). The BP-2 wall mounts with four screws.

1.6 BP-2-24 KIT The BP-2-24 can be ordered from the factory as part of an installation kit, designated as the BP-2-24 Kit. Contained in a single carton is a BP-2-24, a 24Vac power transformer, and a seven-foot, 3-conductor cable. The cable is used to connect power and earth ground from the transformer to the BP-2-24.

1.7 FCC REGISTRATION NUMBER The FCC Registration Number is BW8VH-63354-0T-N. Ringer Equivalence is 0.1B.

2. Applications

2.1 PRIMARY APPLICATION The primary application for the BP-2 is to provide PFT capability for up to eight ground start trunk lines associated with a PBX telephone system.

2.2 FORCED BYPASS CONTROL LINES (FBC) BP-2 functions FBC and Logic FBC allow a normally open (not shorted) contact and/or a logic level signal to place the BP-2 in the PFT mode. FBC can be connected to a PBX alarm contact for automatic operation, or to a switch for manual control. Logic FBC can be connected to a PBX system that provides a logic level signal that acts as a system status indicator. The flexibility of the FBC and Logic FBC functions make the BP-2 compatible with most PBX systems.

2.3 AUXILIARY RELAY CONTACTS Two sets of isolated relay contacts are available for installer-selected applications. Auxiliary Relay Contact NO1 is a normally open (not shorted)

contact that closes (shorts) when the BP-2 goes into the PFT mode. Auxiliary Relay Contact NO2 is a normally open contact that closes when the BP-2 goes into the FBC or Logic FBC enabled PFT mode. A power supply failure will not close NO2.

2.4 NIGHT TRANSFER DEVICE The BP-2 can be used as a night transfer device. After normal business hours, CO ground start trunk lines can be connected to station telephones, bypassing the normal PBX connections. A switch or relay contact is connected to the FBC. Closing (shorting) FBC places the BP-2 in the PFT, or "night transfer" mode. A switch located at an operator's console is the usual installation procedure.

2.5 USING MULTIPLE BP-2's Multiple BP-2's can be connected in a master/slave arrangement to provide more than eight circuits of PFT. Auxiliary relay contacts are provided to easily implement this function.

3. Installation

3.1 CHECKING FOR DAMAGE The BP-2 should be inspected for damage immediately upon receipt. If damage is found a claim should be filed with the shipper. A replacement BP-2 should be ordered if necessary.

3.2 INSTALLATION KIT Included in each BP-2 shipping carton is an installation kit. Each kit contains four #8 pan head screws, two nylon cable ties, and a strip containing eight "BYPASS TELEPHONE" adhesive-backed labels.

3.3 THE COVER The cover is secured via two clamp screws located on the top and bottom of the cover. Remove the cover at this time.

3.4 MOUNTING The BP-2 wall mounts using four #8 screws appropriate for the wall material. Four #8 pan head screws are contained in the installation kit; use these if appropriate.

3.5 BP-2 CONNECTIONS All connections to the BP-2 are made via the two 25-pair plugs, P1 and P2, and a 9-position screw terminal strip TS1. The installer must provide two 25-pair cable mounted connectors to mate with P1 and P2.

3.6 USING THE TERMINAL STRIP In some installations, it is convenient to make connections using the terminal strip. The nine terminals on TS1 parallel nine contacts on plugs P1 and P2. Connections made on TS1 do not have to be made on P1 and P2, and vice-versa.

3.7 INSTALLING AND TERMINATING THE 25-PAIR CONNECTORS Install the two 25-pair cable mounted connectors into plugs P1 and P2. Secure them using the Velcro® straps that are attached to the plugs. Terminate the cables (e.g., in a "66" type block) and cross-connect the pairs with the CO trunks, PBX system trunk and extension ports, and station telephones. Four cable pairs are cross—connected for each of the eight PFT circuits. Detailed connection information is shown in Figure 1. Use the nylon cable ties, provided in the installation kit, to secure the 25-pair cables to the mounting points molded into the BP-2's base.

3.8 CONNECTING POWER The BP-2-24 requires 24Vac or -24Vdc, 225mA maximum for operation. The BP-2-48 requires -48Vdc, 140mA maximum for operation. Use the serial number label to confirm the version you are installing, and then connect the appropriate power source. Power can be connected using either plug P1 or terminal strip TS1.

Warning: Each side of power is connected to a separate pair of wires. The two wires of each pair are connected together inside the BP-2.

Powering with 24Vac (BP-2-24 ONLY): Connect one lead of the 24Vac to the Violet/Brown pair of P1, or to terminal 2 of TS1. Connect the other 24Vac lead to the Violet/Slate pair of P1, or to terminal 3 of TS1. 24Vac operation requires that the red-colored wire jumper loop be cut. It is labeled J1 and is located near the lower right edge of the printed circuit board. When using the BP-2-24 with 24Vac it is important that both sides of the 24Vac be floating (isolated) from earth ground. Failure to provide this condition will result in incorrect BP-2-24 operation.

Powering with -24Vdc (BP-2-24 ONLY): Connect power supply ground to the Violet/Brown pair of P1, or to terminal 2 of TS1. Connect -24Vdc to the Violet/Slate pair of P1, or to terminal 3 of TS1. DO NOT CUT the red colored jumper strap.

Powering with -48Vdc (BP-2-48 ONLY): Connect power supply ground to the Violet/Brown pair of P1, or to terminal 2 of TS1. Connect -48Vdc to the Violet/Slate pair of P1, or to terminal 3 of TS1. There are no jumper straps on the BP-2-48.

3.9 CONNECTING EARTH GROUND Both versions of the BP-2 require a separate earth ground connection for proper operation of the loop start to ground start conversion circuits. Connect earth ground to the Violet/Orange pair of P1, or to terminal 1 of TS1. When using the BP-2-24 with -24Vdc, or the BP-2-48 with -48Vdc, two separate ground connections are necessary: one for earth ground and one for power supply ground. Even if the power supply ground is electrically at earth ground, it still must be connected to the earth ground and power supply ground points on the BP-2. The green colored wire of the 3-conductor cable supplied with the BP-2-24 Kit is meant to connect the power transformer ground terminal-to-terminal 1 of TS1.

3.10 BP-2 CONFIGURATION FOR FBC AND/OR LOGIC FBC OPERATION FBC allows a normally open (not shorted) contact to place the BP-2 in the PFT mode; Logic FBC provides for the use of a logic level signal.

Note: WHEN THE LOGIC FBC OPTION IS NOT UTILIZED, THE LOGIC FBC SWITCH MUST BE SET TO THE HIGH POSITION FOR CORRECT OPERATION.

FBC Connection: With a PBX system, FBC is connected to a normally open (not shorted) alarm contact. As an example: with ROLM CBX II 8000 telephone systems, FBC is connected to the Switch Enable and Ground connections of the Modem Alarm Cable connector J2 on the Service Alarm Panel. Connect the Violet/Green wire of P1, or terminal 5 of TS1, to CBX J2 pin 3; connect the Green/Violet wire of P1, or TS1 terminal 4 to CBX J2 pin 9. The BP-2 will go into the PFT mode when the CBX system gives a switch enable command.

Other brands of PBX systems are also easily interfaced. If the PBX system provides an isolated contact closure (neither side of the contact electrically connected to any other point in the PBX), then simply connect FBC to that contact. If the PBX provides a contact closure that is referenced to PBX system ground (a non-isolated contact closure), such as the ROLM CBX system, connect the Violet/Green wire of P1, or terminal 5 of TS1, to the system ground. The Green/Violet wire of P1, or TS1 terminal 4, should be connected to the contact that closes (shorts) to system ground.

FBC can also be used as a manually operated PFT control by connecting to a remotely located switch or relay contact. **Logic FBC Connection:** For Logic FBC operation, the logic signal

current must be 4mA minimum, 20mA maximum. Exceeding the maximum current rating will destroy circuitry on the BP-2. Insure that the logic source utilizes a current limiting device, usually a resistor, before making any connections. If the logic source is nominally +5Vdc, and is not current limited, install a 1K ohm resistor in series with the Logic FBC connection to provide correct current limiting. Logic FBC connections are made via the Violet/Blue pair of plug P1. Connect logic high (e.g., +5Vdc) to the Violet/Blue wire of P1 and logic ground to the Blue/Violet wire of P1. The Logic FBC switch on the BP-2 should be set at this time. It is located directly to the right of plug P2. The switch allows the use of a normally logic high (e.g., +5Vdc) or normally logic low to trigger FBC. For FBC to trigger when logic high is applied, set the switch to the HIGH position. For FBC to trigger when logic low is applied, set the switch to the LOW position. Note that a setting in the LOW position requires that a logic high (e.g., +5Vdc) be applied continuously for non-PFT operation.

Logic FBC Connection with IBM/ROLM 9722 Redwood® Digital Telephone System: Logic FBC can be connected directly to the Redwood system. Redwood provides a current limited +5Vdc logic signal that is designated as the +5V power-down signal. Power-down is +5Vdc when Redwood is functioning correctly, and changes to 0Vdc upon system failure. Power-down appears on the Black/Green wire of 25-pair plug J52 on the master cabinet. Power-down ground appears on the Green/Black wire of J52. The Logic FBC switch should be set to the LOW position, designating that a logic low will place the BP-2 in the PFT mode. Connect BP-2 J1 Violet/Blue wire to Redwood J52 Black/Green wire; connect BP-2 J1 Blue/Violet wire to Redwood J52 Green/Black wire. No external current limiting resistor is required because Power-down is already current limited.

3.11 AUXILIARY RELAY CONTACTS The BP-2 provides two sets of isolated relay contacts for use in installer-selected applications. Auxiliary Relay Contact NO1 closes (shorts) any time that the BP-2 is in the PFT mode. NO1 will close due to loss of power to the BP-2, as well as when FBC and/or Logic FBC activates the PFT mode. Auxiliary Relay NO2 closes (shorts) only when FBC and/or Logic FBC places the BP-2 in the PFT mode. A loss of power to the BP-2 will not close NO2.

3.12 MULTIPLE BP-2'S Providing PFT for more than eight trunks can easily be accomplished by using multiple BP-2 units. The first BP-2 is designated as Master, and its FBC and/or Logic FBC is connected to the PBX alarm connection, or other switch or contact closure. Auxiliary Relay Contact NO2 on the Master is then connected to FBC on the next BP-2, which we will designate Slave 1. NO2 on Slave 1 is then connected to FBC on Slave 2. This procedure is continued for as many BP-2 units as is required. The slave units will follow the action of the FBC and/or Logic FBC on the master unit. For correct operation, the Logic FBC switch on the slave units must be set to the HIGH position.

3.13 BYPASS TELEPHONE STICKERS Included in the installation kit are eight "BYPASS TELEPHONE" adhesive-backed labels. These labels are provided to identify the station telephones that are connected to the BP-2's PFT channels.

4. Operation

4.1 INSTALLATION REVIEW At this stage the ground start trunks lines, PBX trunk and station ports, and station telephones should be cross connected with the BP-2. Power and earth ground should be connected via P1 or the terminal strip. FBC and/or Logic FBC should be connected if appropriate. Confirm that the Logic FBC switch is set to the desired position. Set it to HIGH if Logic FBC is not being used. If possible, use a voltmeter to confirm that the BP-2 is getting the correct power supply voltage.

4.2 BASIC OPERATION In the normal non-PFT mode of operation, the POWER LED, on the left side of the circuit board, should be lit. If it is not lit, press the POWER switch once. The POWER switch is located on the left side of the circuit board. If it still does not light, check to insure that the external power source is connected correctly.

4.3 FBC OPERATION The FBC LED, located on the right side of the printed circuit board, indicates the status of the Forced Bypass Control Lines FBC and Logic FBC. When FBC and/or Logic FBC is enabled, the FBC LED lights and the BP-2 is in the FBC enabled PFT mode. If the FBC LED is not lit upon initial BP-2 operation, and you have connected FBC or Logic FBC to a PBX alarm contact or manual switch, check for correct FBC operation. Shorting the FBC line, or changing the state of the logic signal should light the FBC LED and place the BP-2 in the PFT mode. The POWER LED will remain lit when the FBC LED is lit. If the FBC LED is lit upon initial BP-2 operation, determine whether this is a problem. There are two reasons for FBC to be enabled. The first reason is legitimate: the external device (PBX, etc.) that is connected to FBC or Logic FBC is giving a command to transfer. This would be the case where a new PBX has not yet been brought up to its operating condition; it is legitimately giving an alarm. The second reason is that Logic FBC is not being used, and the BP-2's Logic FBC switch has not been set to the HIGH position. If a problem still exists, carefully check the wiring to the FBC and Logic FBC connections.

4.4 MULTIPLE BP-2'S If you have connected BP-2's in a master/slave arrangement, it is time to test the configuration. Place all the BP-2's in the non-PFT mode; only the POWER LED should be lit on all units. Enable FBC or Logic FBC on the master unit. The FBC LED on the master and all slave units should light. Release FBC or Logic FBC on the master unit. All units should return to the non-PFT mode.

4.5 TESTING THE BP-2 A reality check is now in order. Place the BP-2 in the non-PFT mode. The POWER LED should be lit; the FBC LED should not be lit. Insure that the ground start trunks that connect to the PBX trunk ports via the BP-2 function correctly. Use the PBX to draw CO dial tone on these trunks. Even if these trunks are incoming only type (such as WATS), you usually still can draw a dial tone. Insure that PBX dial tone can be drawn from the station telephones.

Place the BP-2 in the PFT mode. In this mode, neither LED should be lit OR both LEDs should be lit. The easiest means to go into the PFT mode is to use the POWER switch, located on the left side of the circuit board. Insure that the station telephones can draw a clean (little hum or noise) dial tone from the CO. Dial an outside number. Is the audio path still clean? Receive an incoming call on each station telephone. Are the station telephones labeled with "BYPASS TELEPHONE" stickers?

4.6 NORMAL OPERATION The BP-2 should now be ready for a long career in the exciting field of telecommunications! Normal operation should find the POWER LED lit, and the FBC LED not lit. It is recommended that the BP-2 and associated station telephones' be tested no less than once a year.

5. Circuit Description

5.1 GENERAL The circuit description is intended to familiarize you with the BP-2 for engineering and applications use.

5.2 NON-PFT OPERATION During normal, non-PFT mode, operation power is supplied to the BP-2, the POWER switch is in the ON state, and Forced Bypass Control Lines FBC and Logic FBC are not active. The three PFT relays are energized, connecting the CO ground start trunk lines to the PBX trunk ports, and the PBX station ports to the station telephones. The loop start to ground start conversion circuitry is electrically in series with the station telephone loop, but looks invisible to the PBX and the station telephone. Auxiliary Relay Contact NO1, created by one contact on one of the PFT relays, is open (not shorted). The FBC relay is not energized, making Auxiliary Relay contact NO2 open (not shorted). The POWER LED, on the left side of the printed circuit board, is lit. The FBC LED, on the right side of the printed circuit board, is not lit, indicating that FBC or Logic FBC is not enabled.

5.3 PFT MODE There are three causes for the BP-2 to go into the PFT mode: loss of incoming power, placing the POWER switch to the OFF position, and enabling of the FBC or Logic FBC function. When the BP-2 goes into the PFT mode, the three PFT relays de-energize, connecting the CO ground start trunk lines to the station telephones. The loop start to ground start conversion circuitry is now electrically in series with the CO ground start trunk line and the station telephone. The PFT relays de-energizing causes Auxiliary Relay Contact NO1 to close (short). The POWER LED now does not light.

5.4 LOOP START TO GROUND START CONVERSION CIRCUIT The loop start to ground start (LS-GS) conversion circuit used in the BP-2 can be divided into two sections: ring lead grounding and loop current detection. In the on-hook state, a CO provides nominal -48Vdc on the ring lead of the ground start trunk; the tip lead is floating, i.e., not connected to anything. The LS-GS conversion circuit detects the telephone set going off-hook and establishes a current path from earth ground to the CO ring lead. The CO senses this current and, when ready, seizes (effectively grounding) the tip lead and starts loop current flowing. The LS-GS conversion circuit detects the loop current and stops the current path from earth ground to the ring lead. The CO returns a dial tone, and the call is ready to be dialed.

5.5 INCOMING CALLS The LS-GS conversion circuit does not affect incoming calls to the station telephone.

5.6 OPERATION IN NON-PFT MODE When the BP-2 is in the non-PFT mode the PBX extension ports are connected to the station telephones via the LS-GS conversion circuits. In this loop start mode, the LS-GS conversion circuit looks invisible to both the PBX and the station telephone. When the station telephone is on-hook, the PBX extension port sees approximately 100K ohms from tip to ground. This high impedance, purely resistive load should not interfere with correct PBX operation. Signaling to earth ground is performed only when the BP-2 is in the PFT mode, connecting the CO ground start trunks to the LS-GS conversion circuits.

5.7 IMPROVED CIRCUITRY BP-2-24 units with serial number BP-2-24-17500 or higher, and BP-2-48 units with serial number BP-2-48-3400 or higher, contain an updated LS-GS conversion circuit. There is now improved compatibility between the BP-2 and PBX systems that provides message-waiting indication using neon lamps on 500/2500-type telephone sets. The BP-2 will no longer affect the performance of a PBX system that activates a message-waiting lamp by raising the voltage applied to the tip lead above earth ground potential. An example would be a system that keeps the ring lead at nominal -48Vdc and raises the tip lead from ground to $+70\text{Vdc}$. Also, the BP-2 will no longer affect the performance of a PBX system that activates a message waiting lamp by lowering the voltage applied to the ring lead well below the normal -48Vdc range. An example would be a system that keeps the tip lead at earth ground and lowers the ring lead from -48Vdc to -100Vdc . This improved compatibility will enhance using the BP-2 with PBX systems from manufacturers such as NEC, Northern Telecom, OKI, and Siemens.

The updated circuitry also improves compatibility in the rare instances where CO reverse battery answer supervision is seen by the LS-GS conversion circuitry. The circuitry is no longer affected by this condition.

5.8 FORCED BYPASS CONTROL LINE FBC/LOGIC FBC The FBC enabled PFT mode is initiated by closing (shorting) FBC, or by the presence or absence of a logic signal on the Logic FBC connections. Closing FBC causes the FBC relay to energize. The Logic FBC circuit utilizes an optical isolator to electrically isolate the logic level input signal from the BP-2. A switch selects whether a logic low or logic high input signal activates the FBC relay. The FBC LED is electrically in parallel with the relay coil so that when the FBC relay energizes the FBC LED also lights. The two contacts on the FBC relay are used to control the power to the PFT relays, and to provide Auxiliary Relay NO2.

5.9 TERMINAL STRIP TS1 Terminal Strip TS1 parallels nine contacts on plugs P1 and P2. TS1 provides access to earth ground, power, FBC, and Auxiliary Relay Contacts NO1 and NO2. Logic FBC connections appear only on plug P1.

5.10 24VAC VERSUS -24VDC OPERATION When the BP-2-24 is powered by 24Vac, the installer cuts the red—colored wire jumper loop, placing a resistor in series with the FBC relay. This resistor limits the voltage applied to the FBC relay. When the BP-2-24 is powered by -24Vdc , the jumper loop is not cut, shunting the resistor. This allows the full incoming -24Vdc to be applied to the FBC relay.

5.11 DIFFERENCES BETWEEN -24 AND -48 VERSIONS Slight differences are found between the BP-2-24 and the BP-2-48. One capacitor and the jumper loop are not required for the BP-2-48 and are not inserted into the circuit board. The PFT relays are 24V type for the BP-2-24 and 48V type for the BP-2-48.

6. Specifications

POWER REQUIREMENT

BP-2-24: 24Vac or -24Vdc, 225mA maximum

BP-2-48: -48Vdc, 140mA maximum

RELAY CONTACT RATINGS

NO1, NO2: 1A maximum at 30Vdc or 100Vac (resistive)

FORCED BYPASS CONTROL LINE FBC

FBC is enabled by closing (shorting) the FBC connections. The switch or contact closure must be capable of handling 5mA, 48Vdc.

FORCED BYPASS CONTROL LINE LOGIC FBC

Logic FBC is enabled by changing the logic state of a current limited signal applied to the Logic FBC connections. A switch on the BP-2 selects if the Logic FBC mode is triggered by a logic high or logic low. Minimum logic current 4mA, maximum 20mA.

DIMENSIONS

8.75 inches high (22.2cm)

8.75 inches wide (22.2cm)

3.25 inches deep (8.3cm)

WEIGHT

Approximately 2 pounds (0.9kg)

MOUNTING

Four #8 pan head screws of the type appropriate for the wall material.

7. Incorrect Operation

7.1 INCORRECT SETTING OF THE LOGIC FBC SWITCH If the Logic FBC switch is incorrectly set, the BP-2 may remain "latched" in the FBC enabled PFT mode. It must be set to the HIGH position when the Logic FBC function is not used or when a logic high (normally +5Vdc) is used to trigger FBC. If set to the LOW position, a logic high signal must be present for non-PFT mode operation; absence of the logic high signal will trigger FBC.

7.2 EARTH GROUNDING Insure that a good earth ground connection is provided. Failure to provide an earth ground will result in no, or possibly intermittent loop start to ground start conversion. Failure to provide an earth ground can also result in cross talk between BP-2 circuits; add an earth ground and the cross talk should disappear.

7.3 TRUNK TIP AND RING POLARITY Insure that the CO ground start trunk lines are correctly connected. When a ground start trunk is in the on-hook state, the ring lead should measure nominally -48Vdc with respect to earth ground.

7.4 INCORRECT POWER CONNECTION Insure that the power source is correctly connected to either plug P1 or Terminal Strip TS1. Note that in the BP-2, both wires of the Violet/Brown pair are shorted together, and both wires of the Violet/Slate pair are shorted together. One side of the power to the BP-2 is carried by the Violet/Brown pair, and the other side is carried by the Violet/Slate Pair. Care must be taken so as not to connect both sides of the power source to either of these pairs alone—damage to the power source or the BP-2 may result.

7.5 LOOP RESISTANCE LIMIT In the PFT mode, the station telephone loop is connected in series with the CO ground start trunk line. The sum of the local and CO loop resistances must not exceed the maximum resistance limit, which is approximately 1500 ohms. Incorrect loop start to ground start conversion may occur if the total loop resistance approaches 1500 ohms.

7.6 LOOP EXTENDERS There is one known situation where the BP-2's loop start to ground start conversion circuit may be incompatible. It appears as if ground start trunks that pass through loop extender hardware are more susceptible to ground hum. This problem has been rarely seen as loop extenders are used only on very long loops, as would be the case in rural areas. The symptoms of this problem are a constant ground hum that remains audible on the station telephone, even after a CO dial tone is drawn by the LS-GS circuitry. In this case, the BP-2 is simply not compatible. THIS PROBLEM IS EXTREMELY RARE. Contact Gordon Kapes, Inc. for technical support instead of simply assuming the problem is caused by a loop extender situation.

7.7 APPLICATION LIMITATIONS The BP-2 was designed to operate correctly in most PFT applications. However, Gordon Kapes, Inc. does not guarantee that the BP-2 is compatible with all ground start trunk lines, PBX's and station telephones. All functions of the installed BP-2 should be thoroughly tested before the BP-2 is placed into service.

8. Repair and Replacement

8.1 REPAIR AND REPLACEMENT If you determine that the BP-2 is defective, return for repair or replacement according to the Gordon Kapes, Inc. Warranty/Repair and Return policy.

Specifications and information contained in this technical practice subject to change without notice.

Figure 1 BP-2 Power Failure Transfer Unit Connection Diagram

P1 Pin				P2 Pin			
Number	Cable Color	Connection		Number	Cable Color	Connection	
26	WHT-BLU	T	EXT-1	26	WHT-BLU	T	EXT-5
1	BLU-WHT	R		1	BLU-WHT	R	STA-5
27	WHT-ORN	T	STA-1	27	WHT-ORN	T	STA-5
2	ORN-WHT	R		2	ORN-WHT	R	TRK-5
28	WHT-GRN	T	TRK-1	28	WHT-GRN	T	TRK-5
3	GRN-WHT	R		3	GRN-WHT	R	COT-5
29	WHT-BRN	T	COT-1	29	WHT-BRN	T	COT-5
4	BRN-WHT	R		4	BRN-WHT	R	
30	WHT-SLT	T	EXT-2	30	WHT-SLT	T	EXT-6
5	SLT-WHT	R		5	SLT-WHT	R	STA-6
31	RED-BLU	T	STA-2	31	RED-BLU	T	STA-6
6	BLU-RED	R		6	BLU-RED	R	TRK-6
32	RED-ORN	T	TRK-2	32	RED-ORN	T	TRK-6
7	ORN-RED	R		7	ORN-RED	R	COT-6
33	RED-GRN	T	COT-2	33	RED-GRN	T	COT-6
8	GRN-RED	R		8	GRN-RED	R	
34	RED-BRN	T	EXT-3	34	RED-BRN	T	EXT-7
9	BRN-RED	R		9	BRN-RED	R	STA-7
35	RED-SLT	T	STA-3	35	RED-SLT	T	STA-7
10	SLT-RED	R		10	SLT-RED	R	TRK-7
36	BLK-BLU	T	TRK-3	36	BLK-BLU	T	TRK-7
11	BLU-BLK	R		11	BLU-BLK	R	COT-7
37	BLK-ORN	T	COT-3	37	BLK-ORN	T	COT-7
12	ORN-BLK	R		12	ORN-BLK	R	
38	BLK-GRN	T	EXT-4	38	BLK-GRN	T	EXT-8
13	GRN-BLK	R		13	GRN-BLK	R	STA-8
39	BLK-BRN	T	STA-4	39	BLK-BRN	T	STA-8
14	BRN-BLK	R		14	BRN-BLK	R	TRK-8
40	BLK-SLT	T	TRK-4	40	BLK-SLT	T	TRK-8
15	SLT-BLK	R		15	SLT-BLK	R	COT-8
41	YEL-BLU	T	COT-4	41	YEL-BLU	T	COT-8
16	BLU-YEL	R		16	BLU-YEL	R	
42	YEL-ORN			42	YEL-ORN		
17	ORN-YEL			17	ORN-YEL		
43	YEL-GRN			43	YEL-GRN		
18	GRN-YEL			18	GRN-YEL		
44	YEL-BRN			44	YEL-BRN		
19	BRN-YEL			19	BRN-YEL		
45	YEL-SLT			45	YEL-SLT		
20	SLT-YEL			20	SLT-YEL		
46	VIO-BLU		Logic FBC +5Vdc	46	VIO-BLU		
21	BLU-VIO		Logic FBC GND	21	BLU-VIO		
47	VIO-ORN		GND (Earth)	47	VIO-ORN		
22	ORN-VIO		GND (Earth)	22	ORN-VIO		
48	VIO-GRN		FBC	48	VIO-GRN		
23	GRN-VIO		FBC	23	GRN-VIO		
49	VIO-BRN		See Note 1	49	VIO-BRN		NO2
24	BRN-VIO		See Note 1	24	BRN-VIO		NO2
50	VIO-SLT		See Note 1	50	VIO-SLT		NO1
25	SLT-VIO		See Note 1	25	SLT-VIO		NO1

Terminal Strip TS1

1	2	3	4	5	6	7	8	9
GND (Earth)	See Note 2	FBC	FBC	NO2	NO2	NO1	NO1	

Note 1

P1 Pin Number	Cable Color	BP-2-24 AC Operation	BP-2-24 DC Operation	BP-2-48 DC Operation
49	VIO-BRN	AC Common	GND (pwr sup)	GND (pwr sup)
24	BRN-VIO	AC Common	GND (pwr sup)	GND (pwr sup)
50	VIO-SLT	±24Vac	-24Vdc	-48Vdc
25	SLT-VIO	±24Vac	-24Vdc	-48Vdc

Note 2

TS1 Terminal Number	BP-2-24 AC Operation	BP-2-24 DC Operation	BP-2-48 DC Operation
2	AC Common	GND (pwr sup)	GND (pwr sup)
3	±24Vac	-24Vdc	-48Vdc

Note 3

EXT: Tip and Ring from PBX extension port
 STA: Tip and Ring to station telephone
 TRK: Tip and Ring to PBX trunk port
 COT: Tip and Ring from Central Office (CO)

Note 4

FBC: Forced Bypass Control Line. Close (short) to place BP-2 in PFT mode. For ROLM CBX systems use 15-pin modem/alarm connector J2: Pin 3 to P1, VIO-GRN wire or TS1, terminal 5. Pin 9 to P1, GRN-VIO wire or TS1, terminal 4.

Logic FBC: Apply or remove current limited (4mA minimum, 20mA maximum) +5Vdc logic signal to control FBC. For FBC to trigger on logic high (+5Vdc) set the Logic FBC switch to the HIGH position. For FBC to trigger on logic low (0Vdc) set the Logic FBC switch to the LOW position. For ROLM Redwood systems, use master cabinet plug J52: BLK-GRN wire to BP-2 P1 VIO-BLU wire; GRN-BLK wire to BP-2 P1 BLU-VIO wire. Set the Logic FBC switch to the LOW position.

WHEN NOT USING LOGIC FBC, THE LOGIC FBC SWITCH MUST BE SET TO THE HIGH POSITION FOR CORRECT OPERATION.

Note 5

NO2: Normally open (not shorted) auxiliary relay contact. Closes (shorts) when the BP-2 goes into the FBC or Logic FBC enabled PFT mode. Power failure will not close (short) NO2.

NO1: Normally open (not shorted) auxiliary relay contact. Closes (shorts) when any PFT mode occurs.

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