

TYPE CS28A CHECKBACK (REMOTE) PL-19D428721G2

Schematic 19D435387

DESCRIPTION

The Remote Checkback Module responds to the signal sent by the Master Checkback by sending a signal to the Master Unit during its preassigned time slot. All the timing signals are controlled by a crystal oscillator. When the signal from the Master Checkback is detected, the clock is started.

Normally, each remote uses two time slots, (one for a full power test and the other for a reduced power test) and three remotes may be tested by the Master Checkback. In special applications of more than three remotes some remotes may be assigned only one time slot (see SPECIAL APPLICATIONS). Each segment or time slot of the test is a one second interval.

A manual test switch on the remote unit will generate a signal to the master unit that is recognized as a command to switch to the test mode. This allows a checkback test to be manually initiated at any of the remote sites.

Full and reduced power alarm lights allow the checkback test to be observed at any remote site. A checkback disable input stops any test in progress and resets all circuits.

OPERATION

Refer to the Schematic Diagram and Pictorial Diagram which are included in this section of this manual.

The 32,768 Hz frequency at the output of crystal oscillator AR1 is divided down to 16 Hz at Pin of U1 and down to 1 Hz at Pin 6 of U2. Counters U1 and U2 are inhibited from counting by NOR gate U3-D until a test signal is detected from the Master Checkback.

Input pulses from the Receiver will switch AR2. The output of AR2 is connected to

Bandpass Filter AR3-A and Transistor Switch Q7. As the pulses are received, Q7 causes the alarm lights to flash at a 16 Hz rate.

The 16 Hz pulses are detected by AR3-B and applied to clock input of counter U11 through inverter AR3-C. Timing circuit AR3-D is switched LOW by the first pulse and allows U11 to count the pulses. If a pulse is delayed or missing AR3-D will switch positive and reset counter U11. This prevents random pulses from counting up to the desired number. When counter U11 reaches 8, Pin 9 switches to a 1, setting Flip-Flop U12-B.

This starts counter U14 and when it reaches its predetermined count, Pin 1 momentarily switches to a 1 and this sets Flip-Flop U4-A. Flip-Flop U4-A switches a 1 to Pin 5 of NAND gate U6-B and Pin 12 of NOR gate U3-D. It also applies a 1 to Flip-Flop U5-A and this Flip-Flop is set on the next clock pulse. U3-D switches to a 0 and clock U1 and U2 is started. The 1 Hz clock signal is applied to counter U8 through inverter U3-A and NOR gate U3-B. Jumper B selects the time slot that the remote reports back in at full power and Jumper C selects the time slot that the remote reports back in at reduced power. Pin 2 of counter U8 switches to a 1 during the first period of the 1 Hz clock. When Jumper B is in the 1-2 position, NAND gate U6-B is switched 0 and this gates the 16 Hz pulses through NOR gate U3-C to the STOP output. The output pulses are counted by U7 and when they reach 8, Pin 11 of U7 switches to a 1, resetting Flip-Flop U4-A. Since Flip-Flop U5-A is set, U3-D remains at 0 and the clock continues to run.

At the start of the first time period, Pin 2 of U8, will also set Flip-Flop U16-A, unless jumper D is in the 1-2 position. With jumper D in the 2-3 position, the incoming pulses will flash full power alarm light #1 and will be switched OFF by the 8 pulse detector output U14, Pin 1 through NAND gate U15-A and inverter U15-B.

During the second 1 Hz clock period, remote #2 will report back and the full

power alarm light #2 will be flashed by the 8 incoming pulses and will be switched OFF by the 8 pulse detector through NAND gate U15-C and inverter U15-D.

The above sequence is repeated by remote #3, except with full power alarm light #3, during the third 1 Hz clock period.

At the start of the fourth 1 Hz clock period, the Master Checkback sends 4 pulses at 16 Hz and Pin 10 of counter U8 releases the inhibit on Flip-Flop U4-B. The four pulses are detected by U3-B and when counter U11 reaches 4, Pin 10 switches to a 1 setting Flip-Flop U12-A. Flip-Flop U12-A releases counter U13 and when it reaches its predetermined count, Pin 1 switches to a 1, setting Flip-Flop U4-B. Flip-Flop U4-B switches to a 1 at Pin of NAND gate U6-A.

When jumper C is connected to position 1-2, at the start of the fifth 1 Hz clock period, Pin 1 U8 switches U6-A to 0 and this gates the 16 Hz pulses to the STOP output through NOR gate U3. When counter U7 reaches 4, Pin 1 of U7 switches to a 1 and resets U4-B. At the start of the period U6-A also switches REDUCED POWER, ON, through inverter U6-C. Reduced power is switched off when U4-B resets.

When jumper G is in the 1-2 position, the 4 incoming pulses will flash Reduced Power Alarm Light #1 and then it will be switched OFF by the 4 pulse detector output U13, Pin 1 through NAND gate U19-A.

During the sixth 1 Hz clock period, remote #2 will report back and the reduced power alarm light will be flashed by the 4 incoming pulses and will be switched OFF by the 4 pulse detector through NAND gate, U19-C and inverter U19-D.

The above sequence is repeated by remote #3, except with the reduced power alarm light #3, during the seventh 1 Hz clock period.

At the start of the eighth 1 Hz clock period, Pin 9 of U8 switches to a 1, which resets all circuits, except the alarm light circuits, ending the test.

NOMINAL OPERATING CHARACTERISTICS

1. Power Requirements:
 - +12 VDC, 65 mA
 - 12 VDC, 65 mA
2. Oscillator Frequency (TP1); 32,768 Hz
3. Outputs: Stop, Start and Reduced Power
 - a) OFF: -6 VDC
 - b) ON: +6 VDC
4. Inputs:
 - a) Checkback Disable:
 1. OFF: -6 VDC
 2. ON: +6 VDC
 - b) Input:
 1. OFF: >3.5 VDC
 2. ON: <0.5 VDC
5. Pulse Frequency (TP-2-During Test): 16 Hz
6. Time Slots: 1 sec.

SPECIAL APPLICATIONS

As previously stated each remote (up to three) is normally strapped to respond in both a full power time slot (8 pulses in time slots 2,3 or 4) and in a reduced power time slot (4 pulses in time slots 6, 7 or 8). When it is desired to test more than three remote stations, two or more stations may be programmed to respond in only the full power time slot or in the reduced power time slot. With six time slots available (2, 3, 4, 6, 7 and 8) up to six remotes may be used. Units assigned to time slots 2, 3 and 4 will respond with eight pulses at full power and units assigned time slots 6, 7 and 8 will respond with four pulses at either full or reduced power level. This

special response is accomplished by adding or deleting jumpers W1, W2 and W3. A standard unit (which responds in both a full power and a reduced power time slot) has W1 and W3 installed (W1 and W3 are "zero-ohm" resistors). Modification for response in only one time slot are as follows:

1. Respond only in full power time slot.
 Remove W2. Select time slot with jumpers B and C (Jumper C will not produce an output but must be installed for proper operation).
2. Respond only in reduced power time slot at reduced power level.
 Remove W1. Select time slot with jumper B and C. (Jumper B will not produce an output but must be installed for proper operation).
3. Respond in only reduced power time slot but at full power level.
 Remove W1 and W2. Install W3 (use W1, W2 or solid wire for W3). Select time slot with jumpers B and C (Jumper B will not produce an output but must be installed for proper operation).

The Master Checkback will indicate an alarm for failure of time slots 2, 3 or 4 as "Full Power 1, 2 or 3" respectively and failure of time slots 6, 7 or 8 as "Reduced Power 1, 2 or 3" respectively.

TABLE I
 TYPICAL CHECKBACK (REMOTE)
 TEST POINT READINGS

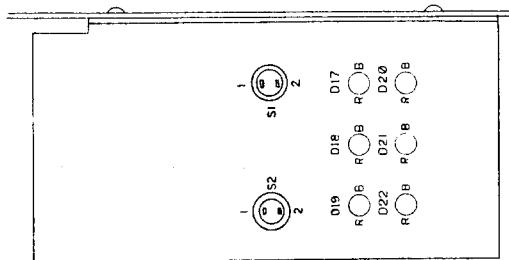
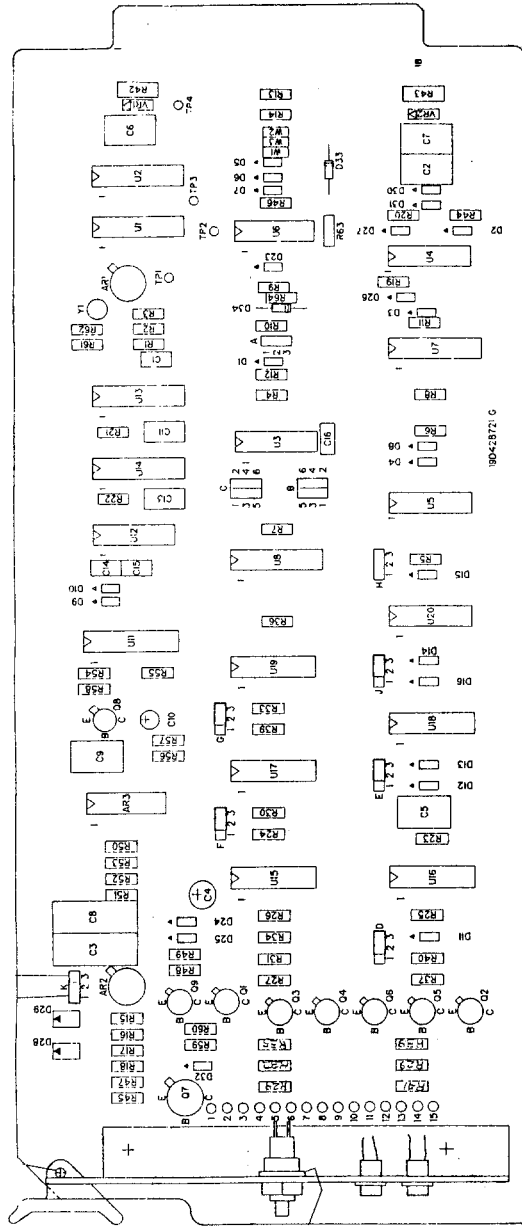
<u>Receiving Normal Input Signal Level from Master, Normal Strapping</u>	
Test Point	Reading
TP-1	Square Wave @ 32.768 Hz
TP-2	Square Wave @ 16 Hz
TP-3	Square Waves @ 1 Hz Amplitude approx. 15 Volts peak-to-peak
<u>FULL POWER TEST</u>	
Pin 4 (Input)	8 Negative Pulses @ 16 Hz rate approx. 15 Volts peak-to-peak
Pin 5 (Stop)	8 Positive Pulses @ 16 Hz rate approx. 15 Volts peak-to-peak
Pin 6 (Red Pwr)	No Signal
Pin 7 (Start)	8 Negative Pulses @ 16 Hz rate approx. 15 Volts peak-to-peak
<u>REDUCED POWER TEST</u>	
Pin 4 (Input)	4 Negative Pulses @ 16 Hz rate Approx. 15 Volts peak-to-peak
Pin 5 (Stop)	4 Negative Pulses @ 16 Hz rate Approx. 15 Volts peak-to-peak
Pin 6 (Red Pwr)	4 Negative Pulses @ 16 Hz rate Approx. 15 Volts peak-to-peak
Pin 7 (Start)	No Signal

ITEM NO.	IDENTIFICATION NUMBER	DESCRIPTION	GROUP NUMBER AND QUANTITY				
			1	2	3	4	5
AR1	19A134379P001	LIN. OP-AMP RCA CA3130T	1	1			
AR2	19A116297P002	INT CKT. SC8273G1 BI	1	1			
AR3	19A116297P005	INT CKT LM248	1	1			
C1	19A116080P101	CAP 0.01 50VDC 10%	1	1			
C2	19A116080P107	CAP 0.1 50VDC 10%	1	1			
C3	19C300075P68001G	CAP 68KPF 2% 100VDC	1	1			
C4	19A134202P015	CAP 6.8UF 35V 20% TANT	1	1			
C5	19A116080P107	CAP 0.1 50VDC 10%	1	1			
C6	19A116080P107	CAP 0.1 50VDC 10%	1	1			
C7	19A116080P107	CAP 0.1 50VDC 10%	1	1			
C8	19C300075P68001G	CAP 68KPF 2% 100VDC	1	1			
C9	19A116080P107	CAP 0.1 50VDC 10%	1	1			
C10	19A134202P014	CAP 1 UF 35V 20% TANT	1	1			
C11	0246A9006P471	CAP 470PF 500V MICA	1	1			
C13	0246A9006P471	CAP 470PF 500V MICA	1	1			
C14	0246A9032P271	CAP 270 PFD MICA	1	1			
C15	0246A9032P271	CAP 270 PFD MICA	1	1			
C16	0246A9036P222	CAP .0022UF 50V 5% POLY	1	1			
C17	0246A9032P271	CAP 270 PFD MICA	1	1			
D17	0246A9416P022	LIGHT EMITTING DIODE RED	1				
D17	0246A9958P001	RED LED 12V LEDCO 4100-2		1			
D18	0246A9416P022	LIGHT EMITTING DIODE RED	1				
D18	0246A9958P001	RED LED 12V LEDCO 4100-2		1			
D19	0246A9416P022	LIGHT EMITTING DIODE RED	1				
D19	0246A9958P001	RED LED 12V LEDCO 4100-2		1			
D20	0246A9416P022	LIGHT EMITTING DIODE RED	1				
D20	0246A9958P001	RED LED 12V LEDCO 4100-2		1			
D21	0246A9416P022	LIGHT EMITTING DIODE RED	1				
D21	0246A9958P001	RED LED 12V LEDCO 4100-2		1			
D22	0246A9416P022	LIGHT EMITTING DIODE RED	1				
D22	0246A9958P001	RED LED 12V LEDCO 4100-2		1			
D28	4037822P001	RECTIFIER - 1N4004G	1	1			
D29	4037822P001	RECTIFIER - 1N4004G	1	1			
Q1	0246A9214P3251	2N3251 TRANSISTOR BI	1	1			
Q2	0246A9214P3251	2N3251 TRANSISTOR BI	1	1			
Q3	0246A9214P3251	2N3251 TRANSISTOR BI	1	1			
Q4	0246A9214P3251	2N3251 TRANSISTOR BI	1	1			
Q5	0246A9214P3251	2N3251 TRANSISTOR BI	1	1			
Q6	0246A9214P3251	2N3251 TRANSISTOR BI	1	1			
Q7	19A115300P002	TSTR NPN 60V 2N3053	1	1			
Q8	19A116755P001	NPN TRANS 2N3947	1	1			
Q9	0246A9214P3251	2N3251 TRANSISTOR BI	1	1			
R1	0246A9134P3013	RES 301KOHM 1/4W 1% MTL	1	1			
R2	0246A9134P3013	RES 301KOHM 1/4W 1% MTL	1	1			
R3	0246A9134P1002	RES 10K OHM 1/4W 1% MTL	1	1			
R4	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R5	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R6	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R7	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R8	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R9	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R10	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R11	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R12	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R13	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R14	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R15	0246A9134P5492	RES 54.9K 1/4W 1%	1	1			
R16	0246A9134P1003	RES 100K OHM 1/4W 1% MTL	1	1			
R17	0246A9134P4022	RES 40.2KOHM 1/4W 1% MTL	1	1			
R18	0246A9134P1003	RES 100K OHM 1/4W 1% MTL	1	1			
R19	0246A9134P1002	RES 10K OHM 1/4W 1% MTL	1	1			
R20	0246A9134P1002	RES 10K OHM 1/4W 1% MTL	1	1			
R21	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R22	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R23	0246A9105P104	RES 100K OHM 1/4W 5% CRN	1	1			
R24	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R25	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R26	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R27	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1			
R28	0246A9134P1911	RES 1.91KOHM 1/4W 1% MTL	1	1			

Figure 1 (19D428721 G1 [4], G2 [3]) Remote Checkback Parts List

ITEM NO.	IDENTIFICATION NUMBER	DESCRIPTION	GROUP NUMBER AND QUANTITY					
			1	2	3	4	5	
R28	0246A9134P7320	RES 732 OHM 1/4W 1% MTL		1				
R29	0246A9134P1911	RES 1.91KOHM 1/4W 1% MTL	1					
R29	0246A9134P7320	RES 732 OHM 1/4W 1% MTL		1				
R30	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1				
R31	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1				
R32	0246A9134P1911	RES 1.91KOHM 1/4W 1% MTL	1					
R32	0246A9134P7320	RES 732 OHM 1/4W 1% MTL		1				
R33	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1				
R34	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1				
R35	0246A9134P1911	RES 1.91KOHM 1/4W 1% MTL	1					
R35	0246A9134P7320	RES 732 OHM 1/4W 1% MTL		1				
R36	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1				
R37	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1				
R38	0246A9134P1911	RES 1.91KOHM 1/4W 1% MTL	1					
R38	0246A9134P7320	RES 732 OHM 1/4W 1% MTL		1				
R39	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1				
R40	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1				
R41	0246A9134P1911	RES 1.91KOHM 1/4W 1% MTL	1					
R41	0246A9134P7320	RES 732 OHM 1/4W 1% MTL		1				
R42	0246A9106P75R0	RESISTOR	1	1				
R43	0246A9106P75R0	RESISTOR	1	1				
R44	0246A9105P104	RES 100K OHM 1/4W 5% CRN	1	1				
R45	0246A9134P5111	RES 5.11KOHM 1/4W 1% MTL	1	1				
R46	0246A9105P103	RES 10K OHM 1/4W 5% CRN	1	1				
R47	0246A9134P1501	RES 1.5K OHM 1/4W 1% MTL	1	1				
R48	0246A9134P1001	RES 1K OHM 1/4W 1% MTL	1	1				
R49	0246A9134P1473	RES 147K OHM 1/4W 1% MTL	1	1				
R50	0246A9134P1473	RES 147K OHM 1/4W 1% MTL	1	1				
R51	0246A9134P2943	RES 294K OHM 1/4W 1% MTL	1	1				
R52	0246A9134P1003	RES 100K OHM 1/4W 1% MTL	1	1				
R53	0246A9134P1743	RES 174K OHM 1/4W 1% MTL	1	1				
R54	0246A9134P2370	RES 237 OHM 1/4W 1%	1	1				
R55	0246A9134P1001	RES 1K OHM 1/4W 1% MTL	1	1				
R56	0246A9134P1001	RES 1K OHM 1/4W 1% MTL	1	1				
R57	0246A9134P1002	RES 10K OHM 1/4W 1% MTL	1	1				
R58	0246A9134P1503	RES 150K OHM 1/4W 1% MTL	1	1				
R59	0246A9134P1002	RES 10K OHM 1/4W 1% MTL	1	1				
R60	0246A9134P5112	RES 51.1KOHM 1/4W 1% MTL	1	1				
R61	0246A9134P5901	RES 5.9K OHM 1/4W 1% MTL	1	1				
R62	0246A9134P1001	RES 1K OHM 1/4W 1% MTL	1	1				
R63	0246A9134P1002	RES 10K OHM 1/4W 1% MTL	1	1				
R64	0246A9134P1002	RES 10K OHM 1/4W 1% MTL	1	1				
S1	7481654P006	SW. PUSH. SPNO. RED	1	1				
S2	7481654P006	SW. PUSH. SPNO. RED	1	1				
U1	0246A9502P4040	I. C. 4040 CMOS	1	1				
U2	0246A9502P4040	I. C. 4040 CMOS	1	1				
U3	0246A9502P4001	I. C. 4001 CMOS	1	1				
U4	0246A9502P4013	I. C. 4013 CMOS	1	1				
U5	0246A9502P4013	I. C. 4013 CMOS	1	1				
U6	0246A9502P4011	I. C. 4011 CMOS	1	1				
U7	0246A9502P4017	I. C. 4017 CMOS	1	1				
U8	0246A9502P4017	I. C. 4017 CMOS	1	1				
U11	0246A9502P4017	I. C. 4017 CMOS	1	1				
U12	0246A9502P4013	I. C. 4013 CMOS	1	1				
U13	0246A9502P4040	I. C. 4040 CMOS	1	1				
U14	0246A9502P4040	I. C. 4040 CMOS	1	1				
U15	0246A9502P4011	I. C. 4011 CMOS	1	1				
U16	0246A9502P4013	I. C. 4013 CMOS	1	1				
U17	0246A9502P4011	I. C. 4011 CMOS	1	1				
U18	0246A9502P4013	I. C. 4013 CMOS	1	1				
U19	0246A9502P4011	I. C. 4011 CMOS	1	1				
U20	0246A9502P4013	I. C. 4013 CMOS	1	1				
VR1	0246A9403P6R2	ZENER 6.2V 5% 400MW	1	1				
VR2	0246A9403P6R2	ZENER 6.2V 5% 400MW	1	1				
W1	0246A9141P001	JUMPER .00 OHM RES	1	1				
W2	0246A9141P001	JUMPER .00 OHM RES	1	1				
Y1	19A701383P001	XTAL 32.768 KHZ	1	1				

Figure 1 (19D428721 G1 [4]. G2 [3]) Remote Checkback Parts List, continued



SECTION A-A

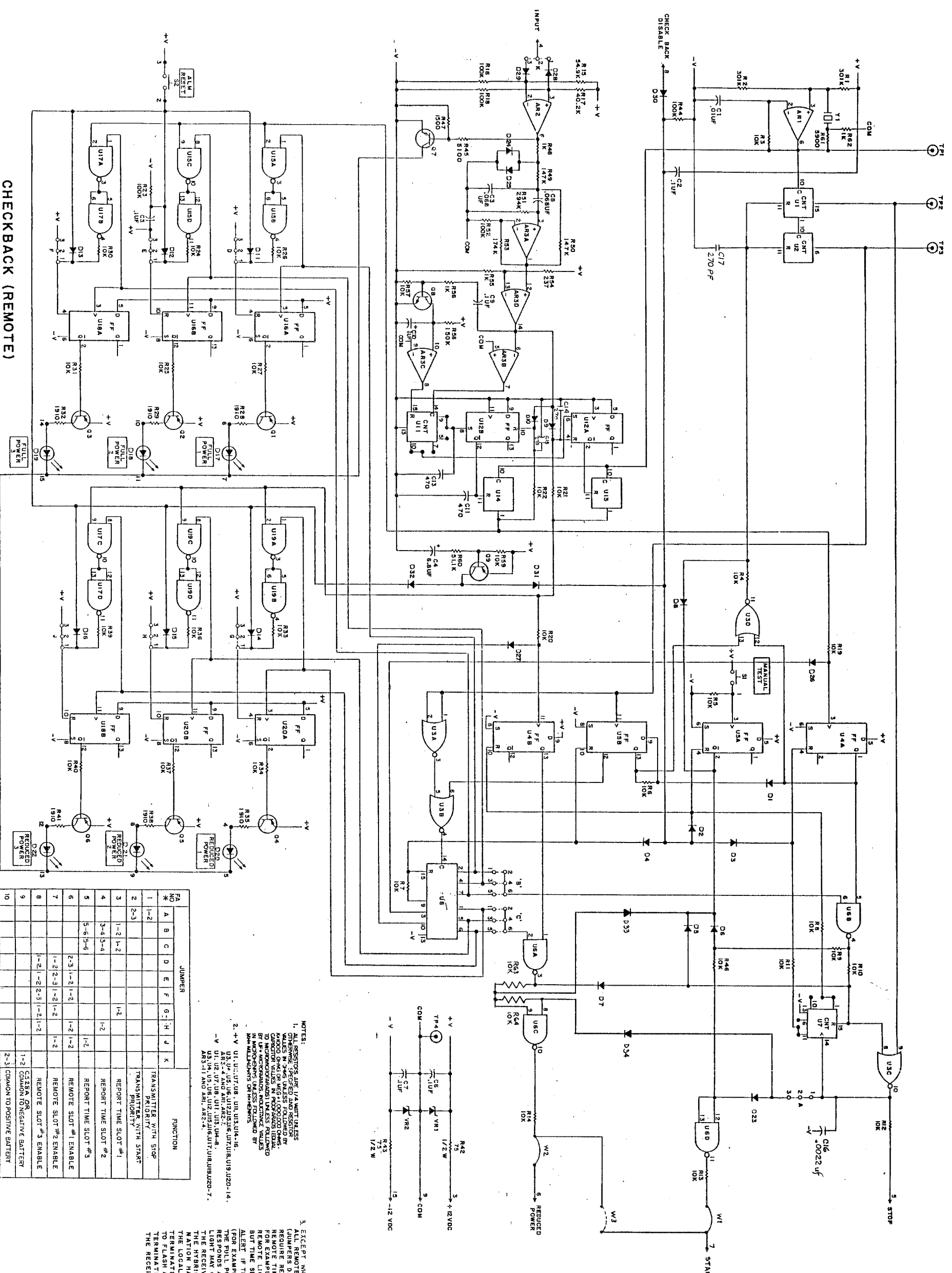
CONNECTION CHART FOR
D17, D18, D19, D20, D21, D22, S1, S2

FROM	TO
D17 R	6
D18 R	7
D19 R	10
D20 R	14
D21 R	15
D22 R	16
S1-1	17
S1-2	18
S2-1	19
S2-2	20
	S1-2

FIGURE 2
PIB4-RP4

- (14) NOTES:
1. SOLDER ALL ELECTRICAL CONNECTIONS.
 2. COMPONENT LEADS TO PROTRUDE .09 MAX.
 3. BELDY SOLDER SIDE OF BOARD.
 4. MARK GROUP NUMBER AND REV. LTR. PER 19411574DPI.1.125 HIGH. (SEE REV. LTR. INDEX A7141044).
 5. TO BE 125 MIN ABOVE BOARD.
 6. THE FOLLOWING COMPONENTS MAY BE ADVERSELY AFFECTED BY FREON CLEANING: S1 & S2
 7. THE FOLLOWING ITEMS ARE MOS DEVICES REQUIRING SPECIAL CARE PER A4029229 UI-07 AND UI0-020.

Figure 2 (19D428721 Sh 2 [1]) Remote Checkback Outline



NOTES:
 1. ALL RESISTORS ARE 1/4WATT UNLESS SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY A PREFIX.
 2. MICROPHONIC RESISTORS ARE INDICATED BY A PREFIX IN PARENTHESES UNLESS FOLLOWED BY A PREFIX IN PARENTHESES.
 3. ALL CAPACITORS ARE 50V UNLESS SPECIFIED.
 4. U1, U2, U3, U4, U5, U6, U7, U8, U9, U10, U11, U12, U13, U14, U15, U16, U17, U18, U19, U20, U21, U22, U23, U24, U25, U26, U27, U28, U29, U30, U31, U32, U33, U34, U35, U36, U37, U38, U39, U40, U41, U42, U43, U44, U45, U46, U47, U48, U49, U50, U51, U52, U53, U54, U55, U56, U57, U58, U59, U60, U61, U62, U63, U64, U65, U66, U67, U68, U69, U70, U71, U72, U73, U74, U75, U76, U77, U78, U79, U80, U81, U82, U83, U84, U85, U86, U87, U88, U89, U90, U91, U92, U93, U94, U95, U96, U97, U98, U99, U100, U101, U102, U103, U104, U105, U106, U107, U108, U109, U110, U111, U112, U113, U114, U115, U116, U117, U118, U119, U120, U121, U122, U123, U124, U125, U126, U127, U128, U129, U130, U131, U132, U133, U134, U135, U136, U137, U138, U139, U140, U141, U142, U143, U144, U145, U146, U147, U148, U149, U150, U151, U152, U153, U154, U155, U156, U157, U158, U159, U160, U161, U162, U163, U164, U165, U166, U167, U168, U169, U170, U171, U172, U173, U174, U175, U176, U177, U178, U179, U180, U181, U182, U183, U184, 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*Figure 3 (19D435387 [6])
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