MAINTENANCE MANUAL

ORION BUFFER BOARD
ROA 117 2280

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SPECIFICATIONS

Input Voltage	+13 Vdc ± 10%
Regulator for Logic	+5 Vdc
Operating Temperature	-30°C to +60°C
Current Drain	
Idle (No Data)	11 Milliamperes (Typical)
Data	15 Milliamperes (Typical)
Alarm	43 Milliamperes (Typical)
Dimensions	6.50" x 2.00"
Voltage Connector point (+13 Vdc)	J3, Pin 2
Ground	J3, Pins 1&3

ERICSSON

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AE/LZB 119 1877 R1A
Printed in U.S.A.

Table 1 - Connector J1 Definition

Terminal	Signal
1	GND
2	DATAIN_CCMI (RS232)

Table 2 - Connector J2 Definition

Terminal	Signal
1	GND
2	DATAIN_TUCCM2 (RS232)

Table 3 - Connector J3 Definition

Terminal	Signal
1	GND
2	A+
3	GND

Table 4 - Connector J4 Definition

Terminal	Signal
1	ENABLE
2	MAJOR_ALARM
3	TUCCM2ALARM
4	CCM1ALARM
5	NC
6	NC

Table 5 - Connector J5 Definition

Terminal	Signal
1	NC1
2	C1
3	NO1
4	NO2
5	NC2
6	LATCHCLEAR
7	NC
8	NC

Table 6 - Connector J6 Definition

Terminal	Signal
1	NC
2	CCM1_DATAOUT (0/13V)
3	NC
4	NC
5	GND
6	NC

Table 7 - Connector J7 Definition

Terminal	Signal
1	NC
2	TUDATAOUT (0/13V)
3	NC
4	NC
5	GND
6	NC

NOTICE!

Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations or substitution of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

NOTICE!

DESCRIPTION

ORION Buffer Board ROA 117 2280 provides level conversion, buffering and fault detection functions for the **C**ontrol **C**hannel **M**onitor **(CCM)** and Test Unit. In its typical application it provides level conversion and buffering so that the output of the CCM ORION radio can be sent to the channel GETC's on the **B**ackup **S**erial **L**ink **(BSL)**. In Simulcast application it provides a similar function sending the output of the ORION Test Unit to the Test Unit Alarm Interface (TUAI) GETC's (for RS-232 Simulcast) or to the Integrated EDACS Alarm (IEA) system (GPS Simulcast). Along with alarms indicating the failure of either radio, a latching alarm is generated if both outputs are gone for approximately two minutes. As both ORION's produce an output whenever a valid control channel exists, this feature allows emergency action to automatically be initiated to restore communications. A LATCHCLEAR input allows remote clearing of the latched alarm.

If a redundant CCM is desired, the Test Unit port can be used for this purpose.

INTERFACE

The inputs from the ORION radios at connectors J1 & J2 are received by RS-232 receiver U7 and converted to logic levels. The buffered outputs to drive multiple GETC's are provided by open collector transistors Q2 & Q3. Connector J6 is for the CCM. Connector J7 is for the Test Unit (or CCM2). Open drain inverters U3 provide alarm outputs at connector J4. The latched alarm outputs are the relay contacts. All six contacts of the dual form C relay are available on connector J5. All of the outputs are cabled from the board to the back of the shelf.

HARDWARE

A 555 timer, U8, and power monitor, U2, provide a "watchdog" time-out function for each input. The 555 is configured as a retriggerable monostable multivibrator. Signals are routed and alarms generated based on the status of these two timers. The enable input (J4-1), with AND gate U1-D, Pins 11, 12 & 13, allows the CCM output to be turned off (as required in Simulcast bypass). Dual D flip flop U5 provides the latching function for relay driver circuit U4 and Q1.

The board operates from the ORION radio A+ (13 Vdc), with an on-board 5 Volt regulator to provide Vcc for the logic circuits.

LED INDICATORS

Refer to Figure 1 for the follwing LED indicators:

POWER - The power indicator (DS2), lights when power is applied to the Buffer Board ROA 117 2280.

CCM (DATA 1 ACTIVITY) **-** The Control Channel Monitor indicator (DS3), in standard applications, will light for every SPACE (+12 Vdc) on the input data stream, and will be off for every MARK (-12 Vdc) or OPEN on the input data stream.

RTU (DATA 2 ACTIVITY) - The Radio Test Unit indicator (DS4), in standard applications, will light for every SPACE (+12 Vdc) on the input data stream, and will be off for every MARK (-12 Vdc) or OPEN on the input data stream.

RELAY LATCH - The Relay Latch indicator (DS1), will light when the ALARM RELAY is latched active. Otherwise, the indicator is off.

Figure 1 - Buffer Board Control Panel

TEST AND TROUBLESHOOT

This board operates from +13 Vdc (A+) applied to power connector J3-2. When power is applied green LED DS2 lights. This voltage can be measured at test point TP67.

Input data (RS-232) is appplied to connector J1-2 (DATAIN_TUCCM1). This data is output on connector J6-2 (CCM1_DATAOUT) at a 0v/+12 volt level. A +12 Vdc at J1-2 corresponds to 0Vdc at J6-2. A -12 Vdc at J1-2 corresponds to +12 Vdc at J6-2. The data pattern should be recognizable so that data integrity can be seen. The data should be the same, with only the level translation and gate delay. The input DATA 1 green LED DS3 lights. This data should not appear on J7-2 (TUDATAOUT).

TEST AND TROUBLESHOOT - Cont.

To test the enable/disable function and redundant CCM operation:

1. Tie the enable input to ground (J4-1). The data stops (J6-2 high). Release J4-1. The data output resumes.

2. Move the input data to J2-2 (DATAIN_TUCCM2). This data is now output at both J6-2 and J7-2. The DATA 2 green LED DS4 lights and DS3 goes out.

3. Tie J4-1 to gournd. The data at J6-2 stops (high) and data at J7-2 remains.

4. Release J4-1.

5. Apply a second (different) data input to J1-2. The second data is output on J6-2, with the first data still present at J7-2. Both DS3 and DS4 LED's lights.

To test the alarm outputs:

1. Disconnect the input to J1-2. J4-4 (CCM1ALARM) alarm (only) goes active (low) within 1 second. It goes inactive (high) upon restoring the input.

2. Disconnect the input to J2-2. The J4-3 (TUCCM2ALARM) alarm (only) goes active 1 minute + 30 or -15 seconds later. It goes inactive (high) upon restoring the input.

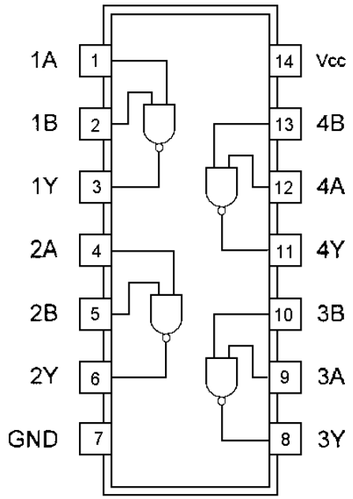
3. Disconnect both inputs. J4-4 goes active in 1 second (already tested). J4-3 and J4-2 major alarms both go active in 1 minute +30 or -15 seconds. The red ALARM LATCH LED DS1 illuminates and the relay trips. Upon restoring either input, the MAJOR_ALARM (J4-2) goes inactive (high). The ALARM LATCH LED remains illuminated until cleared with the LATCH CLEAR input J5-6.

PARTS LIST
ORION BUFFER BOARD
ROA 117 2280

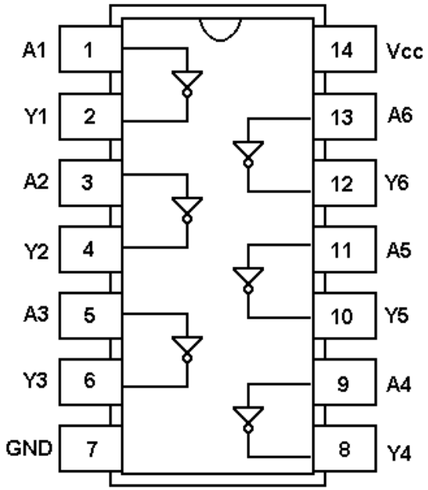
SYMBOL	PART NO.	DESCRIPTION
		- - - -CAPACITORS- - - -
C1	RJE 599 1167/1	Tantalum: 1µ, ± 20%, 16 VDCW.
C2	RJE 326 5103/1	Tantalum: 100 µF, ± 10%, 10 VDCW.
C3	RJE 599 1258/1	Tantalum: 10 µF, ± 20%, 25 VDCW.
C4 and C5	RJC 463 4043/47	Ceramic: 470 pF, ± 5%, 50 VDCW @ 125ºC.
C6	RJE 599 1258/1	Tantalum: 10 µF, ± 20%, 25 VDCW.
C7 and C8	RJC 464 3076/1	Ceramic: 100 nF, ± 10%.
C9 thru C13	RJC 464 3045/1	Ceramic: 10 nF, ± 10%, 50 VDCW.
		- - - -DIODES- - - -
D1 and D2	RKZ 123 601	Schottkey, signal.
D3	RKZ 123 612	Sim to BAS16.
DS1	RKZ 433 615/1	LED: red.
DS2 thru DS4	RKZ 433 615/2	LED: green.
		- - - -CONNECTORS- - - -
J1 and J2	RPV 380 14/102	Radio Data in.
J3	RPV 380 14/103	Power.
J4	RNV 403 19/06	Alarm Out RJ11.
J5	RNV 403 12/08	Relay out/clear RJ1.
J6 and J7	RNV 403 19/06	Data Out RJ11.
		- - - -RELAY- - - -
K1	RAV 947 13/12	DPDT, Sim to 19B235003P1.
		- - - -TRANSISTORS- - - -
Q1 thru Q3	RYN 121 1621/1	NPN.
		- -VOLTAGE REGULATOR- -
Q4	RYT 113 6039/6C	Linear 5 Volt.
		- - - -RESISTORS- - - -
R1 thru R5	REP 607 444/47	4.7 k Ohms •5% 2010, 5 Watt.
R6 thru R9	REP 607 445/1	10 k Ohms.
R10 thru R13	REP 607 444/24	2.4 k Ohms.
R14	REP 607 446/33	330 k Ohms.
R15	REP 607 446/47	470 k Ohms.
R16	REP 607 442/1	10 Ohms.
R17	REP 607 443/24	240 Ohms.
R18 and R19	REP 607 444/2	2 k Ohms.
R20 thru R23	REP 607 426/1	100 k Ohms.
		- -INTEGRATED CIRCUITS- -
U1	RYT 306 2002/C	Quad 2-input AND Gate: Sim to 74C08.
U2	RYT 108 6003/C	ID Timer; Sim to TLC 555.
U3	RYT 306 6021/C	Hex Inverter Open Drain: Sim to 74HC05.
U4	RYT 306 2006/C	Quad 2-input NOR Gate: Sim to 74HC02.
U5	RYT 306 2003/C	Dual D Flip/Flop: Sim to 74HC74.
U6	RYT 306 2007/C	Hex Inverter: Sim to 74HC04.
U7	RYT 109 003/2C	RS-232 Receiver: Sim to 14HC89.
		- - MISCELLANEOUS - -
	SXA 120 4226/2	Panel, Buffer Board.

* COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

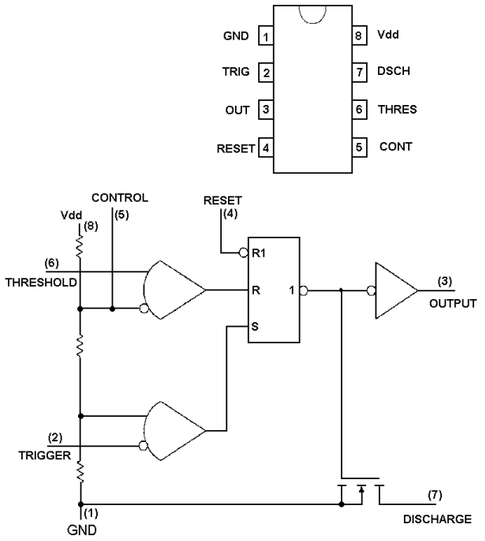
U1
QUAD 2-INPUT AND GATE
RYT 306 2002/C *(74HC08)*



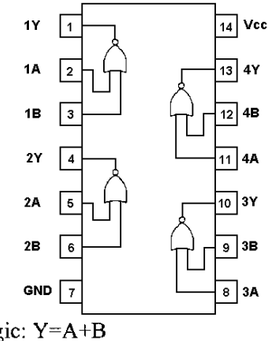
U3
HEX INVERTER, OPEN DRAIN
RYT 306 6021/C *(74HC05)*



U2, U8
ID TIMER
RYT 108 6003/C *(TLC 555)*

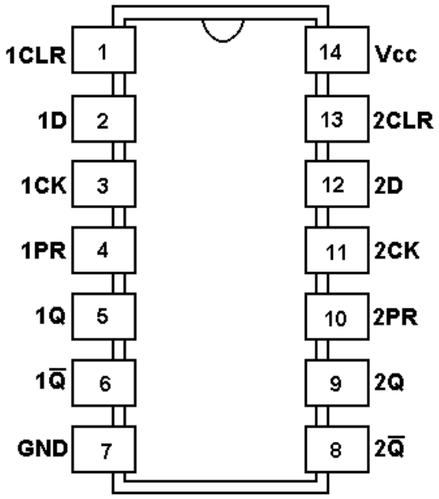


U4
QUAD 2-INPUT NOR GATE
RYT 306 2006/C *(74HC02)*



Positive Logic: Y=A+B

U5
DUAL D FLIP-FLOP
RYT 306 2003/C ***(74HC74)***



Inputs			Outputs		
Preset	**Clear**	**Clock**	**D**	**Q**	**/Q**
l	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H*	H*
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q0	/Q0

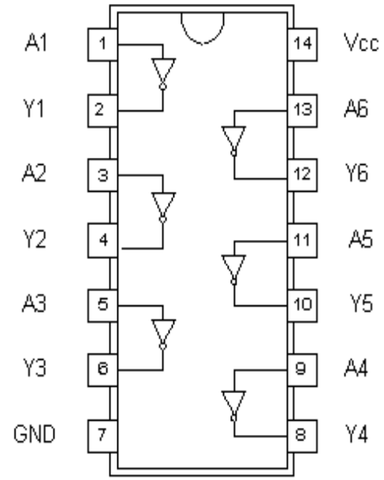
↑ = Transition from low to high level

Q0 = The level of Q after the previous clock pulse

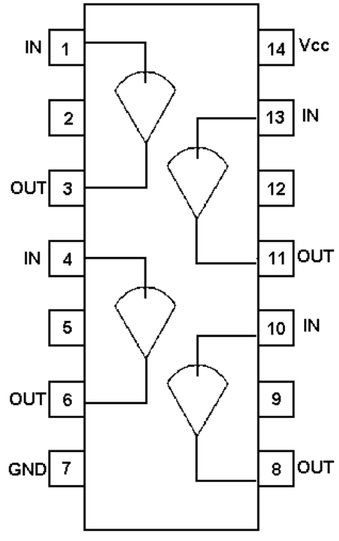
* = Nonstable, don’t preset when PR and CLR are set high

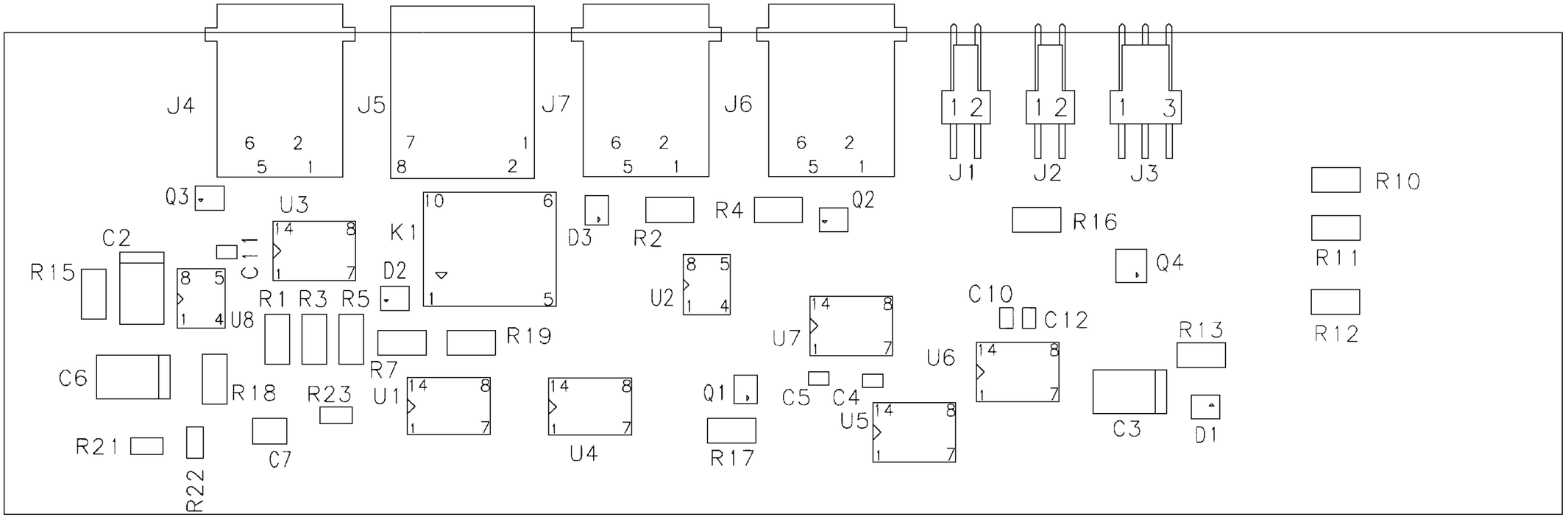
X = Any input, including transition

U6
HEX INVERTER
RYT 306 2007/C ***(74HCO4)***



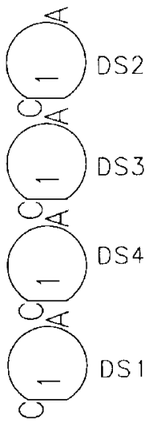
U7
RS-232 RECEIVER
RYT 109 003/2C ***(14HC89)***





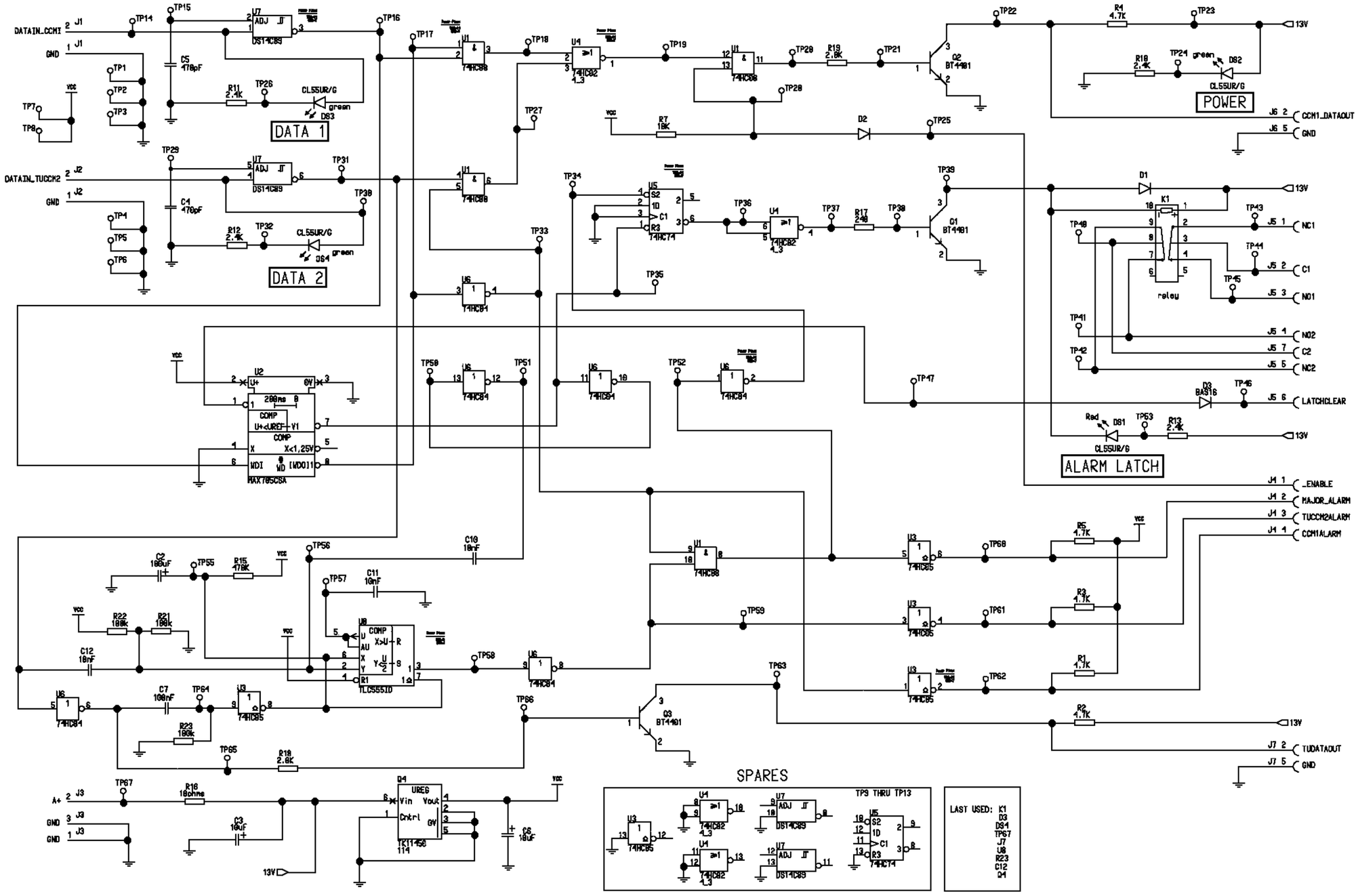
PRIMARY SIDE

(1078 ROA 117 2280, Sheet 1, Rev. B)



SECONDARY SIDE

(1078 ROA 117 2280, Sheet 2, Rev. B)



(1911 ROA 117 2280, Rev. B)

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