

**2.3.3 TRANSMITTER ALARM MODULE**  
TLN6721-CDX -Reference drawings 63C06081S and 31C01341S. The Motorola Transmitter Alarm Module, model TLN6721-CDX is a specially designed plug-in module intended for use in Motorola MSR2000 Base/Repeater Stations. A separate directional coupler provides a dc output proportional to the Tx forward rf power. The detector module compares the dc output to an adjustable reference voltage and provides a contact closure alarm for low forward power. A LED local alarm indicator is also provided for Power Failure. The module can be jumpered for Latched or non-Latched alarms. In addition, an output is provided to give a switched ground output when the Tx output power exceeds the threshold value.

The circuit consists of three main blocks. An inverter to provide the negative voltage, a comparator, and a relay driver for the power and alarms. The circuit is shown on schematic 63C06081S.

The inverter is made up of integrated circuit U1, diodes CR1 and CR2 and capacitors C3 and C4. U1 is a 555 type timer connected as an astable multivibrator. The square wave output is coupled via C3 to CR1 which clamps the output to 0 VDC. C4 is charged via CR2 to approximately -13.6 VDC. Resistor R3 and Zener diode CR3 regulate the -13.6VDC to the -2.7VDC Bvoltage. The B- voltage is used as the negative supply for the comparators to increase the range over which they operate.

The positive dc voltage from the directional coupler is applied via pin 9 and the low pass filter (consisting of coils L1 and L2 and capacitors C7 and C8) to the base of transistor Q1. This voltage is proportional to the transmitter output power. Transistors Q1, Q3, Q5, Q7 and Q9 are connected as a comparator. The reference for the inverting input is set by the resistor chain R16, R17, R18. Q9 is normally on. When the transmitter is operating normally, the input to Q1 is higher than the reference on Q7 and as a result Q1 is on and Q3 is on. The high output is taken from the collector of Q3 and applied to the base of Q9, keeping the junction of R18 and R14 slightly below ground and turning off Q11. The high output from Q11 is inverted by Q13 which changes the reference from B- to ground. When the input on pin 9 drops below the reference voltage set by R17, Q1 turns off, which turns off Q3 and Q9. As a result, the voltage at the junction of R14 and R18 goes slightly above ground since R18 is no longer in the divider chain. This introduces a small amount of hysteresis in the comparator. Q9 also

switches Q11 on which turns on Q13 and charges C19 via R30. Now, provided the transmitter is keyed, pin 19 will be high and pin 5 low. Either JU15 or JU14 will be IN and as a result, the collector of Q22 will be low. This holds Q21 off. Resistor R48 and diode CR17 provide a fast turn on signal for Q21. While Q21 is off, capacitor C19 charges up via R30 to 5.8 VDC where Q15 is turned on, pulling the base of Q19 low. This turns on the PWR FAIL LED (DS1) and relay K2. The contacts of K2 provide the external alarms. If jumper JU12 is installed, the high at the collector of Q19 turns on Q17 via R40 and CR7, latching Q19 on. In this case, the alarm must be reset by turning off Q17 via CR9 using the reset pushbutton S1.

The delay provided by resistor R30 and capacitor C19 ensures that the power failure is not activated while power is coming up to the proper level. This gives a delay of approximately ten seconds.

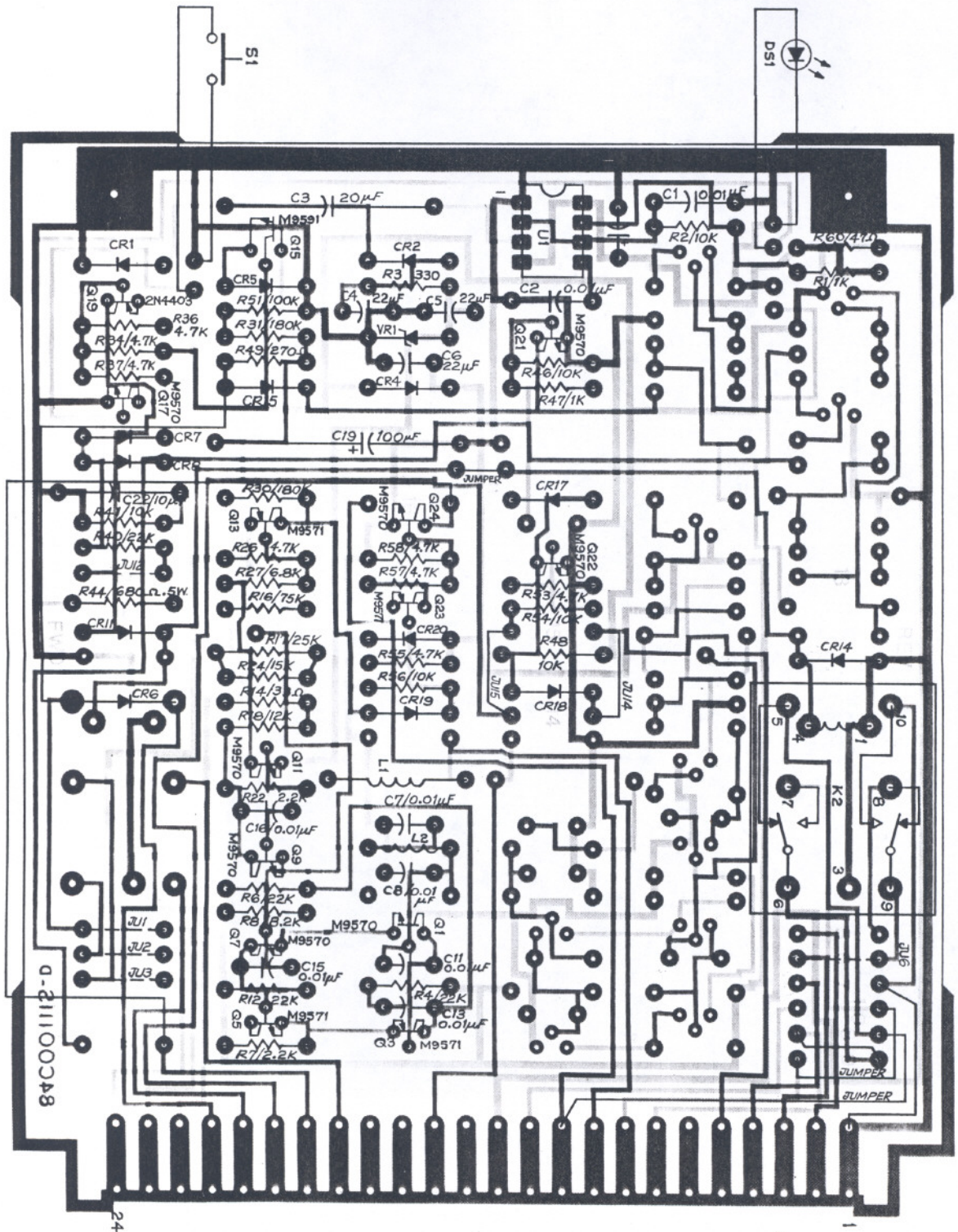
The output of transistor Q13 is also used to activate the CIS. The collector of Q13 is low only when the power is above the reference level. Under these conditions, transistor Q23 is on and is used to turn on Q24 which gives a low at pin 18. When the power is low or the transmitter is off, the collector of Q13 is high, which reverse biases Q23 via diode CR19. When Q23 is off, transistor Q24 is off and there is a high at pin 18.

**2.3.4 GUARD TONE DECODER** TLN2443-CDX - Reference drawing 68P81062E18. The Motorola Guard Tone Decoder, model TLN2443-CDX. TLN2443-CDX is a specially modified version of the standard Guard Tone Decoder model TLN2443A and is intended for use in model C73KSB1106-CDX MSR2000 Automatic Base/Repeater Station.

The TLN2443-CDX Guard Tone Decoder is identical to the standard module model TLN2443A, except the diode CR10 has been removed. This prevents guard tone detection from providing a line PTT (switched ground at pin 16 of the module).

Resistor R92, R93 and transistor Q22 have been installed to provide a switched ground at pin 3 (F1 oscillator ground) when pin 6 is switched high. The drop out delay has been increased to 500ms by changing C21, R75, R76, and R77. This change increases the time delay from loss of guard tone to end of line PTT. In all other respects, the TLN2443-CDX Guard Tone Decoder is identical to the standard Guard Tone Decoder model TLN2443A. Refer to drawing

COMPONENT SIDE



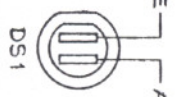
(BOTTOM VIEWS)



M9592



2N4403



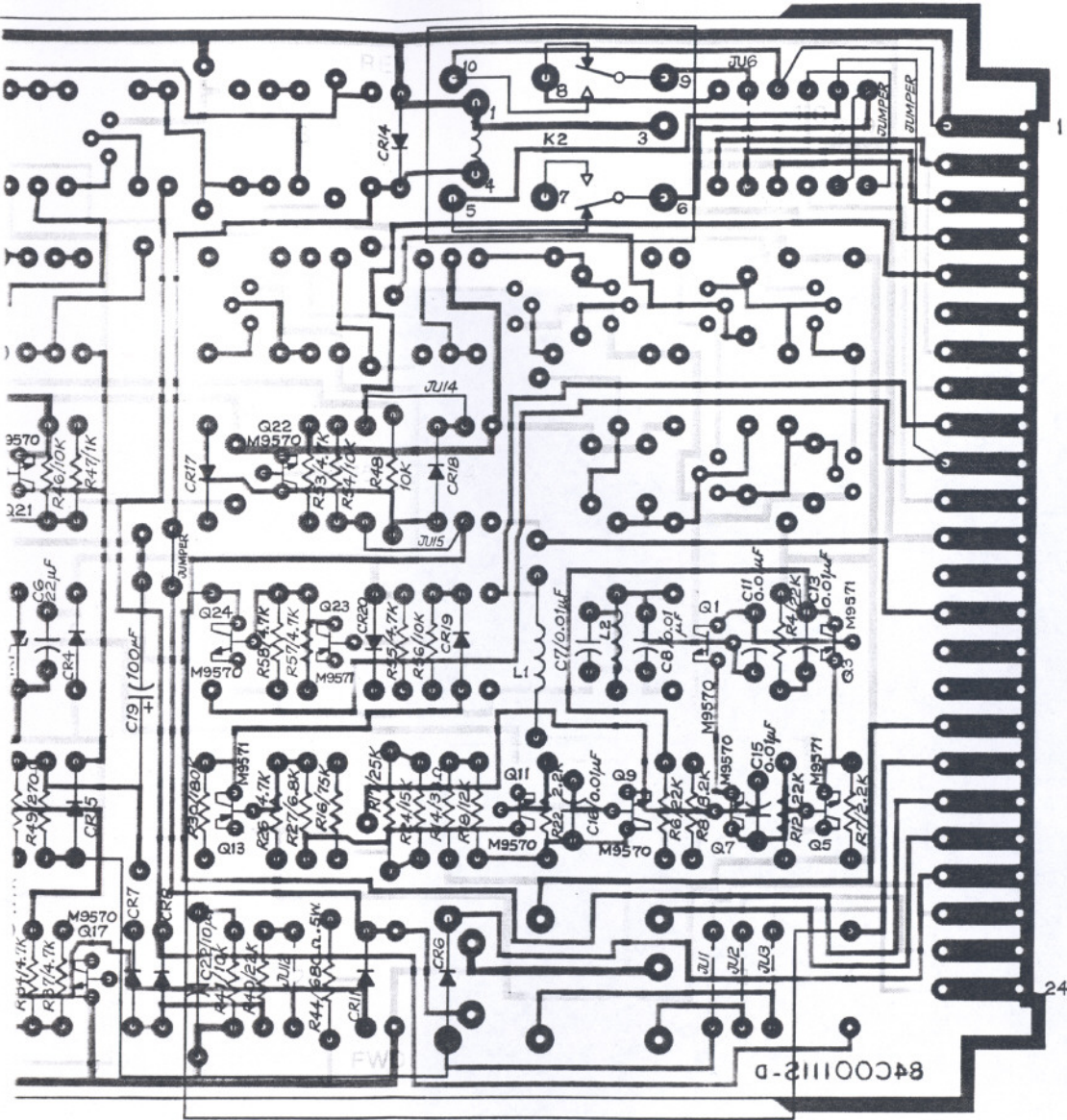
DS1

CATHODE ANODE

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TOLERANCES UNLESS OTHERWISE SPEC.			
		INCHES	MILLIMETRES
ONE PLACE	(0.0)		: 0.3
TWO PLACE	(0.00)	: .01	: 0.13
THREE PLACE	(0.000)	: .005	
HOLE DIA. VARIATION		: .003	: 0.08
ANGULAR DIM.		: 1°	: 1°

SCALE  $\frac{1}{4}$  ALL DIMENSIONS IN MILLIMETRES / INCH DO NOT SCALE DRAWING.

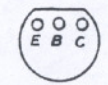


COMPONENT SIDE

CATHODE ANODE



DS1



2N4403



M9592

(BOTTOM VIEWS)

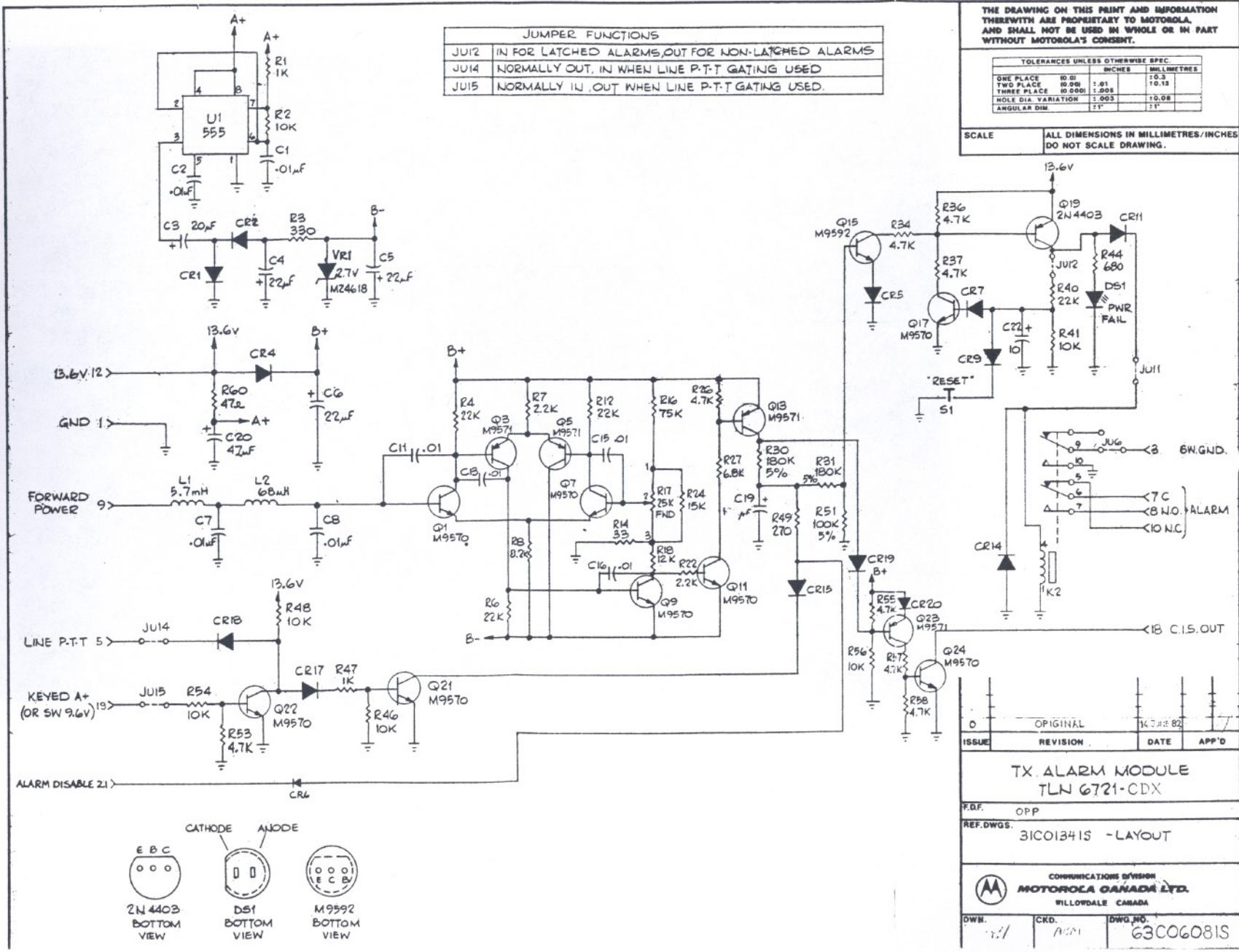
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C	RE-DRAWN-NO CHANGES	27JUN/86		
ISSUE	REVISION	DATE	APP'D	

Tx ALARM MODULE  
TLN6721-CDX

F.D.F. OPP  
REF.DWGS. MECH. - 84C0011S  
ARTWORK - 89C0018IS  
SCHEMATIC - 63C06081S

COMMUNICATIONS DIVISION  
**MOTOROLA CANADA LTD.**  
WILLOWDALE CANADA

DWN. J. PELOU	CKD	DWG. NO. 31H01341S
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JUMPER FUNCTIONS	
JU12	IN FOR LATCHED ALARMS, OUT FOR NON-LATCHED ALARMS
JU14	NORMALLY OUT, IN WHEN LINE P-T-T GATING USED
JU15	NORMALLY IN, OUT WHEN LINE P-T-T GATING USED.

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TOLERANCES UNLESS OTHERWISE SPEC.			
	INCHES	MILLIMETRES	
ONE PLACE	±0.01	±0.1	±0.3
TWO PLACE	±0.005	±0.01	±0.13
THREE PLACE	±0.0001	±0.005	
HOLE DIA. VARIATION	±0.003	±0.08	
ANGULAR DIM.	±1°	±1°	

SCALE: ALL DIMENSIONS IN MILLIMETRES/INCHES DO NOT SCALE DRAWING.

ISSUE	0	ORIGINAL	16 JUN 82	APP'D
REVISION				
DATE				
TX ALARM MODULE TLN 6721-CDX				
F.B.F. OPP				
REF.DWGS. 31C013415 - LAYOUT				
COMMUNICATIONS DIVISION <b>MOTOROLA CANADA LTD.</b> WILLOWDALE CANADA				
DWN.	CRD.	BWG. NO.	DWG. NO.	
			63C060815	

