



Rockwell
International

instructions

Collins Telecommunications Products Division

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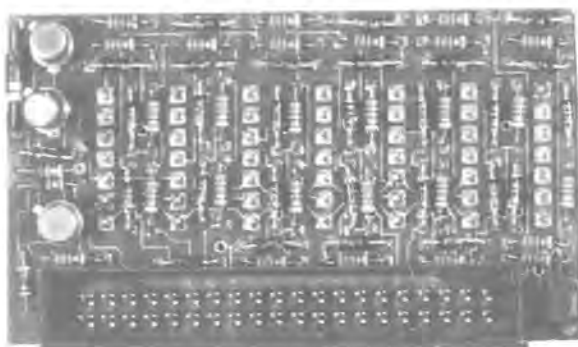
Frequency Switchboard (635-0830-001, -002)

Printed in USA

1. DESCRIPTION

Frequency Switchboard 635-0830-001, -002, shown in figure 1, consists of a 7/8-section thumb-wheel frequency selector switch, a local frequency enable circuit, and logic pullup for logic outputs.

The thumb-wheel frequency selector switches are set for the appropriate digits of the desired frequency, and a parallel bcd frequency control output is supplied from the frequency switchboard. Refer to table 1 and figure 2 for a logic truth table and the pins associated with the bcd outputs.



TP5-2346-017

Frequency Switchboard
Figure 1

2. TESTING/TROUBLESHOOTING PROCEDURES

2.1 Test Equipment and Power Requirements

Test equipment and power sources required to voltage test, troubleshoot, and repair the frequency

Table 1. Frequency Switchboard, Logic Truth Table.

THUMB WHEEL (kHz)	A2J4 PIN NO			
	37	38	NA	NA
10,000	37	38	NA	NA
1,000	33	34	35	36
100	29	30	31	32
10	25	26	27	28
1	21	22	23	24
.1	17	18	19	20
* .01	13	14	15	16
FREQUENCY DIGIT	BCD OUTPUT			
	1	2	4	8
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1
*Not used on 635-0830-001				

NOTICE: This section replaces second edition dated 1 June 1978.

switchboard are listed in the maintenance section of this instruction book.

2.2 Testing

The test procedures in table 2 check total performance of the frequency switchboard. These test procedures permit isolation of a fault to a specific

component or circuit when the results are used with the schematic to circuit trace the fault.

3. REPAIR

Repair of the frequency switchboard is accomplished using the standard planar card repair procedures.

Table 2. Frequency Switchboard, Testing and Troubleshooting Procedures.

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
1. Setup	<p>a. Remove top cover of unit containing frequency switchboard to be tested.</p> <p style="text-align: center;">Note</p> <p>Testing procedures (test 2) on frequency switchboard used in the controls (HF-8090/8091/8092) can be accomplished with the top cover in place.</p> <p>b. If local unit, remove control card A10. Install A10 extender.</p> <p>If control unit, remove parallel input card A11. Install A11 extender.</p> <p style="text-align: center;">Note</p> <p>Control card A10 in local unit or parallel input card A11 in control unit are not installed during tests 3 through 5.</p> <p>c. Apply power to unit.</p>		
2. Testing procedures when installed in control	<p>a. Set CONT switch to TEST.</p> <p>b. Rotate frequency switches through their complete range.</p>	Note that frequency display readout agrees with frequency switch setting.	Proceed to test 3.
3. Testing and troubleshooting procedures	<p>a. Set CONT switch to LCL or NORM.</p> <p>b. Connect dvm to first extender pin shown in chart.</p> <p>c. Rotate associated thumb wheel through its range.</p>	Refer to chart.	<p>If no logic 1 indications, check Q3 and CR2.</p> <p>If no logic 0 indications, check Q1, Q2, and associated components.</p>

Table 2. Frequency Switchboard, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
3. (Cont)			If other malfunctions exist, check components associated with A2J4 pin number of thumb wheel in question.
(Cont)	d. Repeat steps b and c for each extender pin shown in chart.		

THUMB WHEEL (kHz)	BCD OUTPUT	EXTENDER PIN NO	A2J4 PIN NO	THUMB-WHEEL POSITION									
				0	1	2	3	4	5	6	7	8	9
10 000	2 1	129 64	38 37	0 0	0 1	1 0		Not applicable					
1000	8 4 2 1	128 63 127 62	36 35 34 33	0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 0	0 1 0 1	0 1 0 1	0 1 1 0	1 0 0 1	1 0 0 1	
100	8 4 2 1	126 61 125 60	32 31 30 29	0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 0	0 1 0 1	0 1 0 1	0 1 1 0	0 1 0 1	1 0 0 1	
10	8 4 2 1	124 59 123 58	28 27 26 25	0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 0	0 1 0 1	0 1 0 1	0 1 1 0	0 1 0 1	1 0 0 1	
1	8 4 2 1	122 57 121 56	24 23 22 21	0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 0	0 1 0 1	0 1 0 1	0 1 1 0	0 1 0 1	1 0 0 1	
0.1	8 4 2 1	120 55 119 54	19 18 17 16	0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 0	0 1 0 1	0 1 0 1	0 1 1 0	0 1 0 1	1 0 0 1	
*0.01	8 4 2 1	118 53 117 52	15 14 13 12	0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 0	0 1 0 1	0 1 0 1	0 1 1 0	0 1 0 1	0 0 0 1	

Logic 1 - NLT +3.0 V dc.
 Logic 0 - NMT 0.5 V dc.
 *Applicable only to 635-0830-002.

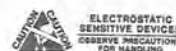
Table 2. Frequency Switchboard, Testing and Troubleshooting Procedures (Cont).

TEST	PROCEDURE	NORMAL INDICATION	IF INDICATION IS ABNORMAL
4. Frequency change signal	<p>a. Set CONT switch to LCL or NORM.</p> <p>b. Connect dvm to extender pin 47 (local unit A10 extender) or extender pin 13 (control unit A11 extender).</p> <p>c. Slowly rotate each frequency switch through its complete range.</p> <p style="text-align: center;">Note</p> <p>Steps d and e are applicable only to frequency switchboards installed in local units.</p> <p>d. Set CONT switch to REM (not applicable to controls).</p> <p>e. Rotate all frequency switches through their complete range.</p>	<p>Note a logic 1 spike between each frequency switch position.</p> <p>Note that there is no logic 1 spike between each frequency switch position.</p> <p>Note the voltage at the associated A2J4 pins for each frequency setting of each switch. 0 V on all pins.</p>	<p>Replace associated switch thumb wheel.</p> <p>Unit malfunction.</p> <p>Unit malfunction.</p>

Refer to the maintenance section of this instruction book for planar card repair procedures.

All supporting parts list illustrations that contain ESDS items are shown with the following symbol.

4. PARTS LIST/DIAGRAMS



4.1 Introduction

Caution

This equipment contains electrostatic discharge sensitive (ESDS) devices. Special handling methods and materials must be used to prevent equipment damage. Refer to the maintenance section for the equipment before assembly/disassembly or repair is performed. ESDS items are identified in the description column of the parts list by (ESDS).

This paragraph assists in identification, requisition, and issuance of parts and in maintenance of the equipment. A parts location illustration, schematic diagram, parts list tabulation, and modification history are included in the schematic diagram (figure 2). The parts location illustration is a design engineering drawing that shows exact component placement on the circuit cards.

Use the reference designator indicated on the schematic and parts location diagram to locate parts in the parts list tabulation. The Collins part number and description are listed for each reference

designator. In addition, the manufacturer's code and part number are listed when applicable.

4.2 Parts List

REF DES Column - Reference designators of each part/subassembly are listed in alphanumeric sequence. These are the reference designators shown on the parts location drawing and schematic diagram.

DESCRIPTION Column - Lists the noun name, modifier, descriptive information, and modifications.

Modifications are identified by an alphanumeric identifier assigned to each design change. These identifiers are referenced in the DESCRIPTION column of the parts list in parentheses and on the schematic diagram inside an arrow that points to the change. Each change relates to the revision identifier (REV) stamped on the circuit card/subassembly and is listed in the EFFECTIVITY column of the modification history.

COLLINS PART NUMBER Column - Lists the Collins part number for each item in the parts list.

USABLE ON CODE Column - Part variations within a group of equipment are indicated by a letter code (A, B, C, etc). Absence of a code indicates part applied to all models.

MFR CODE Column - Lists the manufacturer's code from which selected parts can be procured.

MFR PART NUMBER Column - Lists the manufacturer's part number for the selected parts.

Listed below are the manufacturer's names and addresses for the manufacturer's codes used in this parts list.

<u>CODE</u>	<u>MANUFACTURER'S NAME AND ADDRESS</u>
00779	AMP, Inc. P.O. Box 3608 Harrisburg, PA 17105
03508	General Electric Co. Semi-Conductor Products Dept. W. Genesee St. Auburn, NY 13021

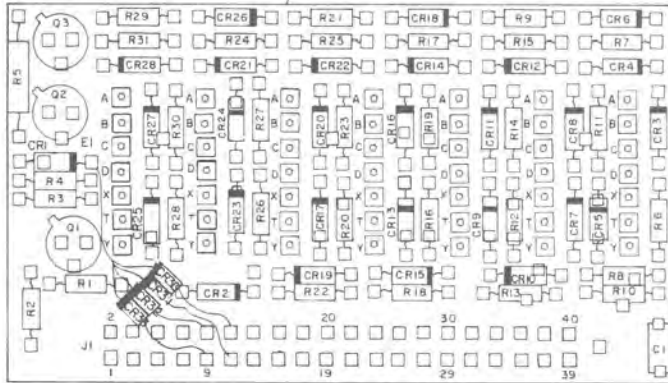
<u>CODE</u>	<u>MANUFACTURER'S NAME AND ADDRESS</u>
04713	Motorola, Inc. Semiconductor Products Group 5005 E. McDowell Rd. Phoenix, AZ 85008
07126	Digitran Co., The 855 South Arroyo Parkway Pasadena, CA 91105
07263	Fairchild Camera and Instrument Corp. Semiconductor Div. 464 Ellis St. Mountain View, CA 94042
81349	Military Specifications

4.3 Equipment Covered

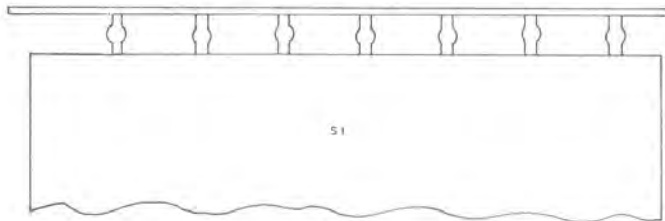
Listed below are the circuit cards/subassemblies with the latest effectivity covered by these instructions.

<u>CIRCUIT CARD/SUBASSEMBLY</u>	<u>COLLINS PART NUMBER</u>	<u>LATEST EFFECTIVITY</u>
Frequency switchboard	635-0830-001	REV H
Frequency switchboard	635-0830-002	REV H

SEE DETAIL A



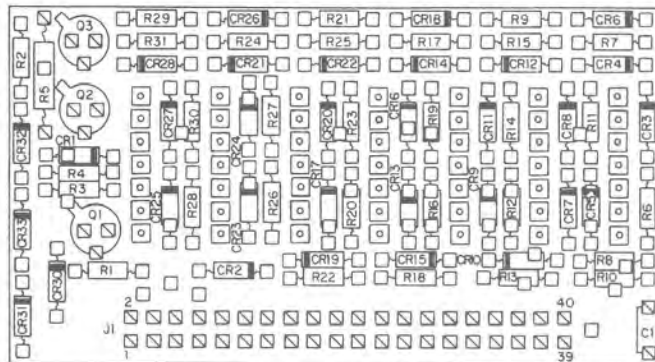
NOTE: CR30 THRU CR33 ARE MOUNTED ON BOTTOM OF BOARD



DETAIL A

CI 77123

TP5-1040-019

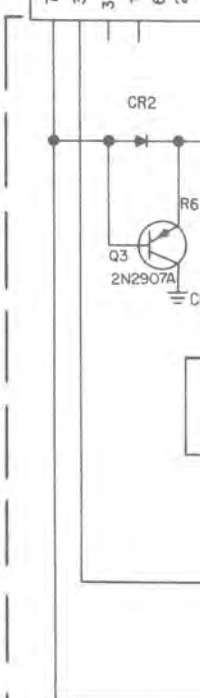


CI 77273

TPA-2404-011

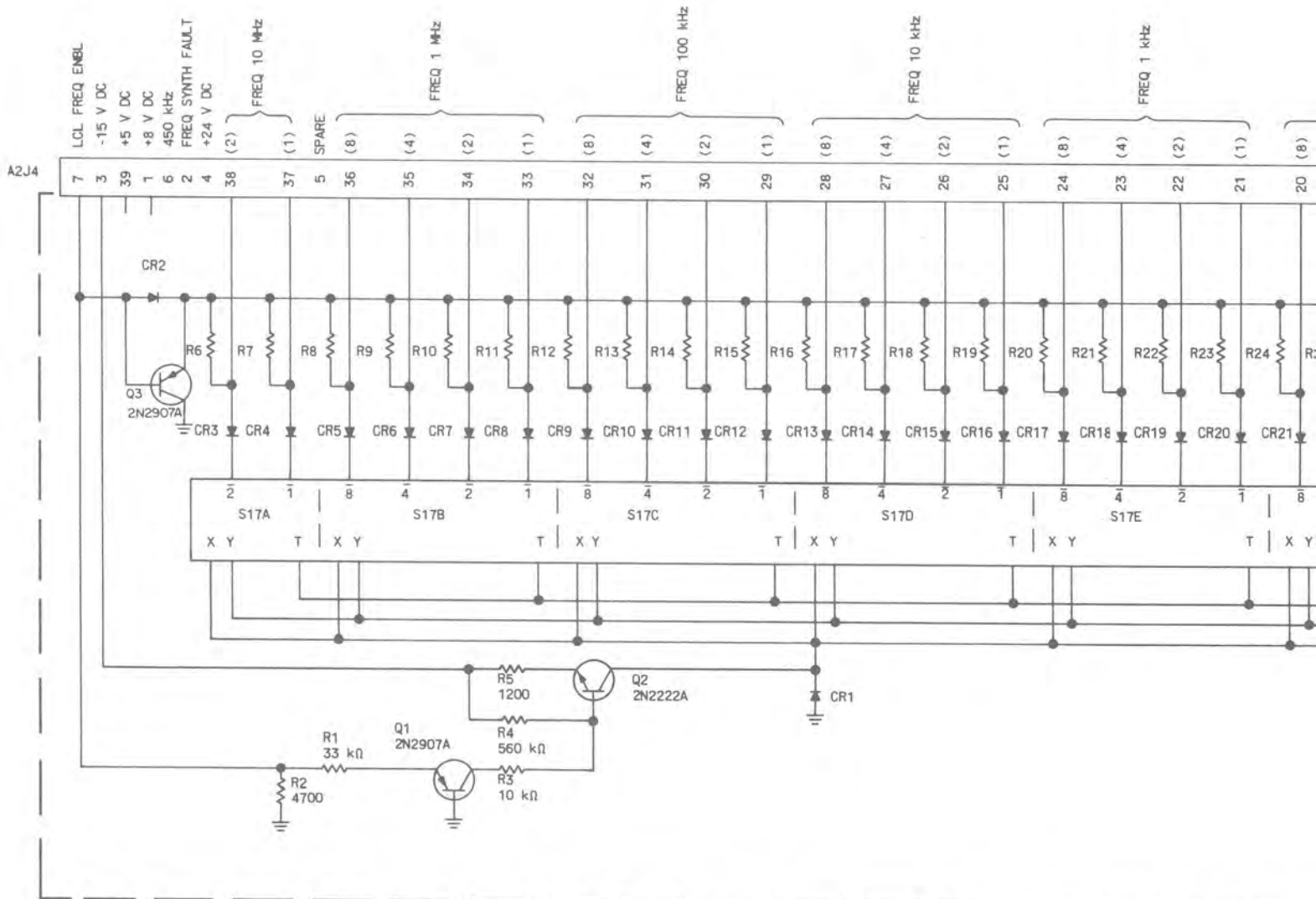
LCL FREQ ENBL
 -15 V DC
 +5 V DC
 +8 V DC
 450 kHz
 FREQ SYNTH FAULT

A2J4



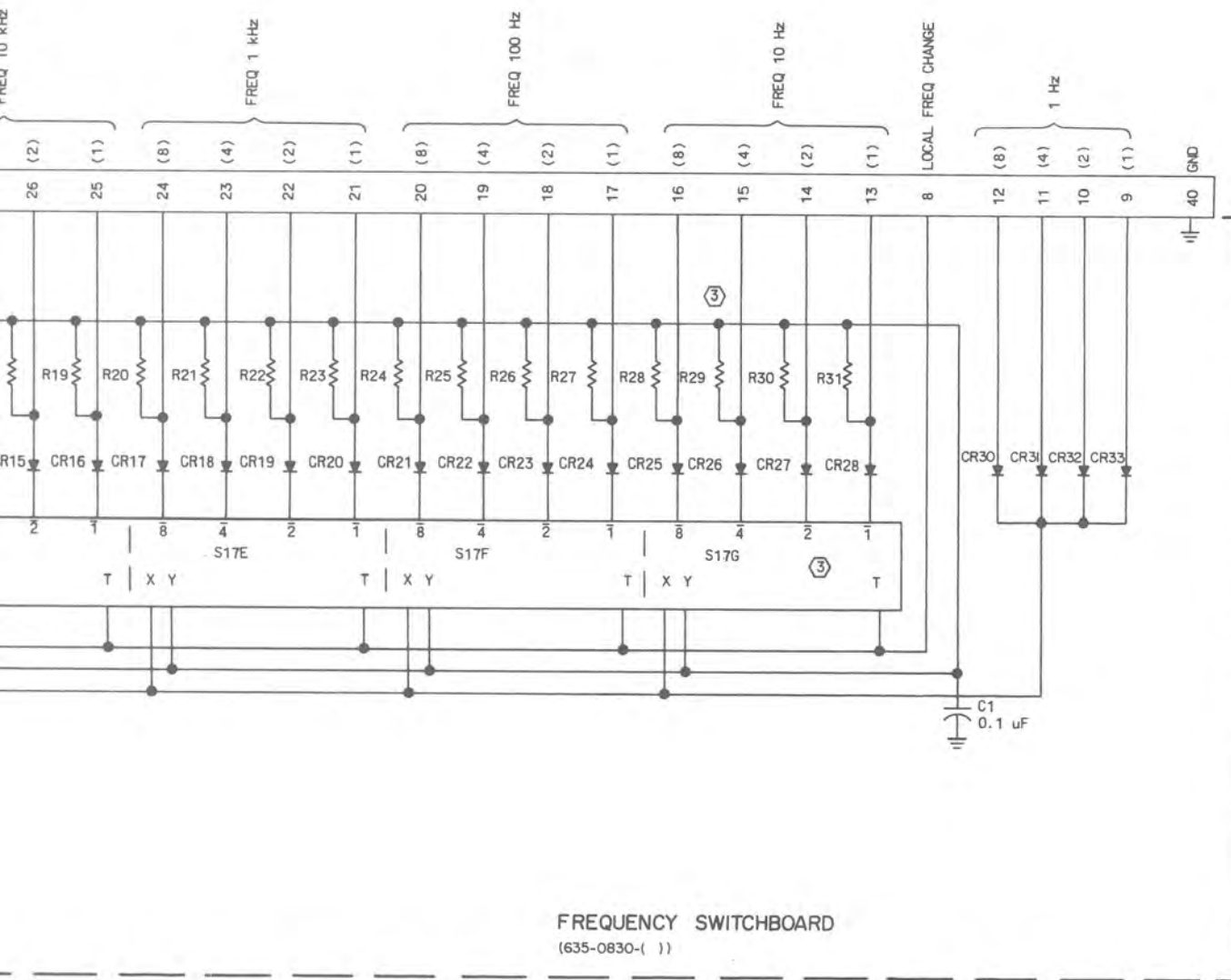
NOTES:

- ① ALL DIODES ARE
- ② UNLESS OTHER
- ③ THE 10 Hz FREQ PART OF 635-0 ARE CONNECT



NOTES:

- ① ALL DIODES ARE TYPE 1N4454.
- ② UNLESS OTHERWISE SPECIFIED, RESISTANCE VALUES ARE IN OHMS. R6-R31 ARE 33 kΩ.
- ③ THE 10 Hz FREQUENCY DIGIT S17G AND ASSOCIATED COMPONENTS R28 THRU R31 ARE PART OF 635-0830-002 ONLY. IN THE 635-0830-001 CR25 THRU CR28 CATHODES ARE CONNECTED THE SAME AS CR30 THRU CR33 CATHODES.



FREQUENCY SWITCHBOARD
(635-0830-)

PARTS LIST

REF DES	DESCRIPTION	COLLINS PART NUMBER	USABLE ON CODE	MFR CODE	MFR PART NUMBER
	FREQUENCY SWITCHBOARD	635-0830-001	A		
	FREQUENCY SWITCHBOARD	635-0830-002	B		
CR1-CR28	SEMICOND DEVICE	353-3644-010		03508	1N4454GE
CR29	NOT USED				
CR30- CR33	SEMICOND DEVICE	353-3644-010		03508	1N4454GE
C1	CAPACITOR,FXD CER DIEI, 0.1UF, PORM10%, 50V	913-5019-320		81349	CK05BX104K
J4	HOUSING,CONN,EL	372-0043-480		00779	87478-7
Q1	TRANSISTOR	352-0551-010		04713	2N2907A
Q2	TRANSISTOR	352-0661-020		07263	2N2222A
Q3	TRANSISTOR	352-0551-010		04713	2N2907A
R1	RESISTOR,FXD CHPSN, 33K, 10%, 1/8W	745-2395-000		81349	RCR05G333KS
R2	RESISTOR,FXD CHPSN, 4.7K, 10%, 1/8W	745-2365-000		81349	RCR05G472KS
R3	RESISTOR,FXD CHPSN, 10K, 10%, 1/8W	745-2377-000		81349	RCR05G103KS
R4	RESISTOR,FXD CHPSN, 560K, 10%, 1/8W	745-2440-000		81349	RCR05G564KS
R5	RESISTOR,FXD CHPSN, 1.2K, 10%, 1/4W	745-0752-000		81349	RCR07G122KS
R6-R27	RESISTOR,FXD CHPSN, 33K, 10%, 1/8W	745-2395-000		81349	RCR05G333KS
R28-R31	RESISTOR,FXD CHPSN, 33K, 10%, 1/8W	745-2395-000	B	81349	RCR05G333KS
S1	SWITCH ASSEMBLY	259-9651-010	A	07126	29C63
S1	SWITCH ASSEMBLY	259-9651-020	B	07126	29C64