# MAINTENANCE MANUAL ORION<sup>TM</sup> 900 MHz SYNTHESIZER/RECEIVER/EXCITER BOARD B19/CMN-359

TABLE OF CONTENTS	
	Page
DESCRIPTION	Front Cover
CIRCUIT ANALYSIS	1 1 2 2 3
IC DATA	4
PARTS LIST	5 5 7
SCHEMATIC DIAGRAM	10 10 11

## DESCRIPTION

The **ORION**<sup>™</sup> Synthesizer/Receiver/Exciter board provides, on one printed circuit board, circuits for the synthesizer, receiver and transmit exciter. The synthesizer circuit generates transmit frequencies for two ranges, which are 896-902 MHz and 935-941 MHz. The synthesizer circuit also generates receiver injection frequencies, 426.4-429.4 MHz.

The FM dual-conversion, super-heterodyne receiver is designed for operation in the 935-941 MHz frequency range. A regulated 9.0 volts is provided to all receiver stages except the audio PA IC, which operates from the switched A+ supply.

The receive circuit has Intermediate Frequencies (IF's) of 82.2 MHz and 455 kHz. Adjacent channel selectivity is

obtained by using a band-pass filters, an 82.2 MHz crystal filter and a 455 kHz ceramic filter.

The receive circuit except for the synthesizer circuit consists of:

- Front End and Mixer
- 82.2 MHz First IF, 455 kHz Second IF and FM Detector
- Audio Signal Processor (ASP), includes Squelch
- Audio PA

The receiver RF Front End and First Mixer circuit is on the Receive/Exciter/Synthesizer board. The 82.2 MHz first IF, FM Detector, Audio Signal Processor (ASP) and Audio PA circuits are on the System Control Logic/IF/Audio board. (Refer to Maintenance Manual LBI-39057).

> Ericsson Inc. Private Radio Systems Mountain View Road Lynchburg, Virginia 24502 1-800-528-7711 (Outside USA, 804-528-7711)



## **CIRCUIT ANALYSIS**

#### **FREQUENCY SYNTHESIZER**

The frequency synthesizer receives **SYNTH CLOCK**, **SYNTH DATA** and control information from the microcomputer and from this generates the transmit and receive RF frequencies (refer to Figure 1). The synthesizer also provides frequency-lock status to the microcomputer. The synthesizer consists of synthesizer chip IC201, low and high current buffers, loop filters, transmit and receiver Voltage Controlled Oscillators (VCO's), feedback amplifier, the dual-modulus prescaler and the reference oscillator. The VCO's are locked to the reference oscillator by a single direct-divide synthesis loop consisting of the feed back buffer, prescaler, and synthesizer. The transmit VCO operates over a frequency range of 448 MHz to 470.5 MHz. The receiver VCO operates over a range of 426.4 MHz to 429.4 MHz.

#### **Reference Oscillator**

The reference oscillator consists of a 1.5 PPM Temperature Compensated X(crystal) Oscillator (TCXO). The standard reference oscillator frequency is 12.8 MHz.

The TCXO is enclosed in an RF shielded can. Access to the oscillator trimmer is made through the hole in the top of the can. The TCXO is compensated by an internal temperature-compensated circuit for both low and high temperatures. With no additional compensation, the oscillators will provide 1.5 PPM stability from -30-degrees Centigrade to +60-degrees Centigrade.

#### **Synthesizer**

Synthesizer IC201 contains a programmable reference oscillator divider ( $\div$ **R**), phase detector and programmable VCO dividers ( $\div$ **N**,  $\div$ **A**). The reference frequency, 12.8 MHz, from the reference oscillator, is divided by a fixed integer number to obtain a 6.25 kHz or a 5 kHz channel reference for the synthesizer. This divide value can be changed by PROM programming. The internal phase detector compares the output of the reference divider with the output of the internal N, A counter. The **N**, **A** counter receives as an input the VCO frequency divided by the dual-modulus prescaler and programmed by the microcomputer. This comparison results in a error voltage when the phases differ and a constant output voltage, when the phase-detector inputs compare in frequency and phase.

If a phase error is detected, an error voltage is developed and applied to the VCO DC offset buffer, high current buffers and loop filter to reset the VCO frequency. The count of the  $\div$ N,  $\div$ A counters is controlled by the frequency data received on the SYNTH CLOCK and SYNTH DATA lines from the microcomputer. When a different channel is selected, or when changing to the transmit or receive mode, an error voltage is generated and appears at the phase-detector output, APD OUT, causing the Phase-Lock-Loop (PLL) to acquire the new frequency.

The **SYNTH ENABLE** pulse from the microcomputer enables the synthesizer and allows frequency data to be internally stored.

## **Equalizer**

The equalizer circuit consists of operational amplifier IC203-A, resistors R205 and R207 and capacitor C205. This circuit receives transmit audio from Loop Modulation Adjust RV201. The output of the equalizer is summed with the output signal from the Phase Detector or by adder operational amplifier IC203-B.

#### DC Offset And High Current Buffers

DC offset buffer transistors TR201 and TR202 and diode CD202-A receive the error voltage from the synthesizer and increase the level of this error voltage by 1.8 Vdc. This extends the operating range of the high-current buffers. When the **PLL** is off-frequency due to a channel change or frequency drift, the error voltage from the synthesizer (**APD**) rises or falls, turning TR201 either on or off. This transistor (TR201) controls the DC offset buffer transistor TR202. Resistor R124, diode CD202-A and transistor TR202 complete a high-current rapid charge or discharge path for capacitors C210-C212. As the error voltage decreases, TR201, TR202 and CD202-A turn on, completing a discharge path for C210 to C212. When the error voltage goes positive, TR201, TR202 and CD212 are turned off allowing C210 - C212 to charge through R214.





## LBI-39059A

When a channel is changed in receive and when changing from transmit to receive, bilateral switches IC204-C, E, B and D are turned on for 4 milliseconds. When changing from receive to transmit, IC204-C, E, B and D are turned on for 10 milliseconds.

## Loop Filter

The loop-filter consists of resistors R216 through R218 and capacitors C210 through C212. This filter controls the bandwidth and stability of the synthesizer loop. Bilateral switch IC204 is controlled by 9-Volt SYNTH BAND-WIDTH pulse. When the SYNTH BANDWIDTH pulse is present, the bilateral switch shorts out the low-pass filter, greatly increasing the loop bandwidth to achieve the 4-millisecond channel acquisition time required for dual priority scan. The low-pass filter removes noise and other extraneous signals internal to the synthesizer chips. The output of the filter is applied to the varicaps in the transmit and receive VCO's to adjust and maintain the VCO frequency.

The use of two VCO's allows rapid independent selection of transmit and receive frequencies across the frequency split.

#### **Receiver Voltage Controlled Oscillator**

The receiver VCO consists of low-noise, silicon, JFET oscillator transistor, TR241, followed by high-gain buffer transistor TR242. Transistor TR242 prevents external loading and provides power gain. The VCO is a Collpoitts oscillator circuit with the various varactors, capacitors and a high-O resonator coil forming the tank circuit

The VCO is switched ON and Off under the control of the  $\overline{\mathbf{T/R}}$  line. When the  $\overline{\mathbf{T/R}}$  line is high the Receive VCO is turned on (Transistor TR243 is on). Oscillator output is typically 0 dBm. The output is applied to the feedback buffer for VCO frequency control and as the receive injection frequency to the receiver first mixer through Local Oscillator buffers on the receive board. The receive VCO also uses a high-Q resonator to achieve superior noise performance. The VCO operates over a frequency range of 426.4-429.4 MHz. The VCO voltage need only be set once at the highest frequency of the band split, after which it will operate over the entire split with no more tuning.

#### **Transmit Voltage Controlled Oscillator**

The transmit VCO is basically the same as the receive VCO. The wideband VCO allows frequency separation of 6 MHz as determined by the bandsplit the radio is operating on, 896-902 MHz or 935-941 MHz. The varactors in conjunction with the frequency segment selector (transistor

TR2301 and bandswitching diodes CD277 and CD278) provide a voltage-controlled adjustment range that extends across the entire frequency split. VCO control switch TR273 turns the transmit VCO on when  $\overline{T/R}$  line is low.

## **Feedback Buffer**

The buffered output of the receive VCO and transmit VCO from buffer transistors TR242 and TR247 respectively, are supplied to the feedback buffer IC206. The buffered VCO output also provides receive or transmit injection drive.

#### **Dual Modulus Prescaler**

The dual Modulus prescaler completes the PLL feedback path from the synthesizer to loop-filter, to the VCO's and feedback buffers and then back to the synthesizer through the prescaler. The prescaler divides the VCO frequency by 128 or 129 under control of M CONT from the synthesizer. The output of the prescaler is applied to the synthesizer where it is divided down to 6.25 kHz by an internal  $\div$ N,  $\div$ A counter and compared in frequency and phase with the divided-down frequency from the reference oscillator. The result of this comparison is the error voltage used to maintain frequency lock. The  $\div$ N,  $\div$ A counter is controlled by data received from the microcomputer. Depending on the operating frequency, the DC voltage at TP201 should be within the range 3.5 to 7.5 Vdc when the PLL is locked.

## Lock Detect

The lock detect circuit consists of comparator IC207, diodes CD204 and CD205 and reference oscillator mute switch transistor TR203. It is used to quickly synchronize the phase relation of the divided-down VCO frequency and the reference oscillator if the loop loses lock. It also provides a fast lock detect signal to the microcomputer to turn to the out-of-lock indicator. If a large change in frequency is required, the ramp capacitor output (CR) of the synthesizer may increase positive Lock Detect (LD) line from the synthesizer. Thus, transistor TR203 disables the reference oscillator and allows the PLL to be brought back to synchronization rapidly.

If a large error exists, the LD positive lead from the synthesizer will carry negative spikes to the microcomputer. Transistor TR203 is turned on, preventing reference oscillator muting.

#### **Loop Modulation Adjust**

The loop modulation adjustment circuit automatically sets the loop modulation level applied to the equalizer IC202 and IC203 through loop modulation adjust RV201. The loop

modulation adjust modulation circuits consists of transistors TR2304, and TR2305 and resistors R238, R2001, R2005 and RV201. The loop modulation level is controlled by turning transistor switch TR230 on or off to include attenuators R238, R2001 and R2005 in the circuit. Resistors R238, R2001 and R2005 form an adjustable voltage divider to change the loop modulation level as required. Table 1 also identifies the resistor (if applicable) used for each frequency segment.

#### **Frequency Segment Selector**

The frequency-segment selector switches capacitance in and out of the transmit and receive VCO tank circuits to select the frequency segment containing the selected channel. The frequency segment selector consists of transistor TR2301, and diodes CD277 and CD278 and operates under control of the microcomputer. Capacitors C289, C292 and C2710 are selected or deselected for operation in a given segment. Table 2 identifies the circuit conditions existing for selection of each segment and the capacitor used.

Reverse bias to turn off the band switching diodes are provided by the +8 Volts filtered supply through resistor R2303. Forward bias for the diodes and current for the switching transistors is provided by the +8 Volts supply through resistors R2301 and R2302. When segment 1 is selected, transistor TR2301 is turned on. In the transmit VCO diodes CD277 and CD278 are turned on. Capacitors C289 and C2710 are connected to ground by CD277 and CD278.

#### **Table 1 - Frequency Segment Selection**

Segment	Frequency Split (MHz)	Synth Band 1 (Input TR2301)	Grounded Modulation Resistor
1	896-902	1	R238
2	935-941	0	R2005

#### Table 2 - Capacitor Selection

Segment	Transistor Switch TR2301	Band Switching Diodes CD277, CD278T	Grounded Capacitors
1	1	ON	C289, C2710
2	0	OFF	None

## **RECEIVE CIRCUIT**

## **Receiver Front End**

The RF signal from the antenna is coupled through the lowpass filter, antenna switch and dielectric band-pass filter FL401 to the input of RF amplifier transistor TR401 (refer to Figure 2). The output of TR401 is coupled through dielectric bandpass filter FL402 and capacitor C411 to the input of the first mixer circuit at Z421. Receive Front End selectivity is provided by dielectric band pass filters FL401 and FL402.

## **Receiver Injection**

Receiver RF injection (426.4 - 429.4 MHz) from the synthesizer VCO is applied to **DOUBLER** transistor TR461. The input level of TR461 is between 0.5 and 1.0 milliwatts. The output of TR461 is coupled to the input of amplifier transistor TR462. The output of amplifier TR462 is filtered by dielectric filter FL403. This filter is tuned to pass frequency in the 852.8 - 858.8 MHz pass band. The output of FL403 is coupled through capacitor C422 to the input of the first mixer circuit at Z421.

## <u>1st Mixer</u>

RF from the receive front-end and injection frequency/voltage from the multiplier stage are mixed together at Z421. This mixture of RF and Injection frequencies is applied through capacitor C420 to the base of transistor TR421. Transistor TR421 provides high power gain for the mixer stage. The difference between the RF and the injection frequency produces an 82.2 MHz first IF output on the collector of TR421. The 82.2 MHz first IF output signal is coupled from the collector of TR421 through an impedance matching network consisting of Z422, capacitor C424, resistor R425, inductor L401, capacitor C430 and an attenuator pad consisting of resistors R428 through R430 to connector J501, Pin 1. Connector J501 connects to P501 located on the System Control Logic/IF/Audio Board CMF-138.

Circuit analysis for the receive circuit continues in Maintenance Manual LBI-39057, System Control Logic/IF/Audio Board, CMF-138. Maintenance Manual LBI-39057 continues with the 1st IF, 2nd Mixer and 2nd IF and Detector.



## **9-VOLT REGULATOR**

The SWITCHED A+ supplied from J501, Pin 17 is regulated to +9 Vdc by regulator IC481 (3-terminal Regulator). The +9 volts regulated output on IC481, Pin 3 is applied to exciter transistors TR151 and TR153 through Tx power switch TR152.

When **TX ENBL** is high (receive mode), +9V is not applied.

The Exciter is energized by when the **TX ENBL state is** made low by the microprocessor, causing TR152 to conduct and apply the regulated +9 Volts to all exciter stages. A typical emitter voltage for TR151 is 1.5 volts.

## **EXCITER CIRCUIT**

The Exciter circuit consist of a multiplier circuit (doubler) and a wide-band amplifier stage operating over a frequency range of 896-941 MHz without any tuning (refer to Figure 3). The exciter amplifies the approximately 1.0 milliwatt signal from the synthesizer transmit VCO to provide 9 milliwatt (typical) drive to the RF power amplifier circuit.



Figure 3 - Exciter Block Diagram

Figure 2 - Receiver Block Diagram

## LBI-39059A

The 448-470.5 MHz transmit injection input from the synthesizer transmit VCO is applied to the base circuit of doubler transistor TR151 through an attenuator pad consisting of resistors R152 thru R153. Supply voltage (+9 Vdc) from TR152 is applied to TR151 through a collector feed network consisting of resistor R168 and Z151. Capacitors C156 and C157 are bypass capacitors.

The output of TR151 drives amplifier transistor TR153 through the impedance matching components consisting of capacitor C168, resistor R162 and the coupling capacitor C158. Collector voltage +9 Vdc is applied to TR153 through collector the feed network consisting of resistor R167 and Z152. Capacitors C159 and C165 are bypass capacitors.

The output of TR153 is coupled to FL151 band pass filter at pass band 896-941 MHz through an attenuator pad consisting of resistors R164 through R166. The output of FL151 is coupled to connector J151. Transistor TR153 amplifies the approximately 1 milliwatt input level to 9 milliwatt (typical).

#### SYNTHESIZER IC201



#### **BILATERAL SWITCH IC204**



In/Out o

Control 💁









PRESCALER IC205





**RF WIDE BAND AMPLIFIER IC206** 



(TOP VIEV)

## **DUAL OPERATIONAL AMPLIFIER IC203**









IN g



174 of device shown

ol .	Switch
SS	OFF
ЪС	ON



## IC DATA

#### **POSITIVE VOLTAGE REGULATOR IC481**

#### **DUAL COMPARATOR IC207**

OUT 1

IN(-) 1

IN (+) 1 🕄

GND 4





#### POSITIVE VOLTAGE REGULATOR IC230

(TOP VIEW)

OUT 2

6 IN (-) 2

5 IN (+) 2





#### SYNTHESIZER/RECEIVER/EXCITER BOARD SYNTHESIZER SECTION CMN-359-2

_		-		-	
	ls	sι	ıe	2	

SYMBOL         PART NO.         DESCRIPTION         C246 and C247           C201         NOTE: Parts listed are for reference only. Refer         Ceramic: $0.047 \ \mu F \pm 10\% \ 25 \ VDCW,$ temp coef $\pm 15\%.$ C248           C202         to Service parts.         Ceramic: $470 \ pF \pm 5\% \ 50 \ VDCW,$ temp coef $\pm 15\%.$ C249           C204         Serviceable parts.         Ceramic: $0.047 \ \mu F \pm 10\% \ 25 \ VDCW,$ temp coef $\pm 15\%.$ C240           C204         Serviceable parts.         Ceramic: $0.047 \ \mu F \pm 10\% \ 50 \ VDCW,$ temp coef $\pm 15\%.$ C251           C206         Polyseter: $0.47 \ \mu F \pm 10\% \ 50 \ VDCW,$ temp coef $\pm 15\%.$ C252           C207         Electrolytic: $47 \ \mu F \pm 20\% \ 16 \ VDCW,$ C253           C211         Ceramic: $0.047 \ \mu F \pm 10\% \ 25 \ VDCW,$ C266           C212         Polypropylene: $0.1 \ \mu F 5 \ 10\% \ 50 \ VDCW,$ C267           C214         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ C270           C214         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ C271           C215         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ C271           C214         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ C273           C214         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ C276           C215         Ceramic: $1000 \ pF \pm $				0245
C201         NOTE: Parts listed are for inference only. Refer        CAPACITORS Ceramic: 0.047 µF ± 10% 25 VDCW, temp coef ± 15%.         C247           C202         Serviceable serviceable parts.         Ceramic: 270 $pF \pm 5\%$ 50 VDCW, temp coef ± 350-1000 PPM.         C249           C203         Serviceable serviceable parts.         Ceramic: 0.047 µF ± 10% 25 VDCW, temp coef ± 15%.         C250           C204         Serviceable serviceable parts.         Ceramic: 0.047 µF ± 10% 50 VDCW, temp coef ± 15%.         C251           C205         Polyset: 0.47 µF ± 10% 50 VDCW, temp coef ± 15%.         C252           C206         Polypropylene: 1 µF ± 10% 50 VDCW, temp coef ± 15%.         C266           C207         Ceramic: 0.047 µF ± 10% 25 VDCW, temp coef ± 15%.         C267           C211         Ceramic: 10.047 µF ± 10% 50 VDCW, temp coef ± 15%.         C269           C212         Polypropylene: 0.1 µF 5% 50 VDCW, temp coef ± 15%.         C270           C214         Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.         C271           C215         Ceramic: 0.047 µF ± 10% 25 VDCW, temp coef ± 15%.         C272           C216         Ceramic: 0.047 µF ± 10% 50 VDCW, temp coef ± 15%.         C273           C216         Ceramic: 0.047 µF ± 10% 50 VDCW, temp coef ± 15%.         C274           C218         Ceramic: 0.000 pF ± 10% 50 VDCW, temp coef ± 15%.         C2	SYMBOL	PART NO.	DESCRIPTION	C246
C201         NOTE: Parts listed are for reference only. Refer         Ceramic: $0.047  \mu\text{F} \pm 10\%  25  \text{VDCW},$ temp coef $\pm 15\%.$ C244           C202         to Service serviceable parts.         Ceramic: $0.047  \mu\text{F} \pm 20\%  10  \text{VDCW}.$ C248           C203         to Service serviceable parts.         Ceramic: $0.047  \mu\text{F} \pm 10\%  25  \text{VDCW},$ temp coef $\pm 15\%.$ C250           C204         Serviceable parts.         Ceramic: $0.047  \mu\text{F} \pm 10\%  50  \text{VDCW}.$ C251           C205         Ceramic: $0.047  \mu\text{F} \pm 10\%  50  \text{VDCW}.$ C252           C206         Polyster: $0.47  \mu\text{F} \pm 10\%  50  \text{VDCW}.$ C253           C207         Electrolytic: $47  \mu\text{F} \pm 20\%  16  \text{VDCW}.$ C266           C210         Polypropylene: $1  \mu\text{F} \pm 10\%  50  \text{VDCW}.$ C268           C211         Ceramic: 1000 pF \pm 10\%  50  \text{VDCW}.         C269           C212         Polypropylene: $0.1  \mu\text{F}  5\%  50  \text{VDCW}.$ C270           C214         Ceramic: $1000  p\text{F} \pm 10\%  50  \text{VDCW}.$ C271           C215         Ceramic: $0.047  \mu\text{F} \pm 10\%  50  \text{VDCW}.$ C272           C216         Ceramic: $1000  p\text{F} \pm 10\%  50  \text{VDCW}.$ C276           C221         Ceramic: $1000  p\text{F} \pm 10\%  50  \text{VDCW}.$ C276           C222			CAPACITORS	and
Parts listed reformed only. Refer construct Sections for serviceable parts.         temp coef $\pm 15\%$ .         C249         C249           C201         to Service sections for serviceable parts.         Ceramic: $470 \text{ pf} \pm 10\% 25 \text{ VDCW}, tempcoef \pm 350 \text{ VDCW}, tempcoef \pm 15\%.         C250           C205         Ceramic: 0.047 \text{ µF} \pm 10\% 50 \text{ VDCW}, tempcoef \pm 15\%.         C251           C206         Polysester: 0.47 \text{ µF} \pm 10\% 50 \text{ VDCW}, tempcoef \pm 15\%.         C252           C207         For polytopylene: 1.4F \pm 10\% 50 \text{ VDCW}, tempcoef \pm 15\%.         C266           C210         Polypropylene: 1.4F \pm 10\% 50 \text{ VDCW}, tempcoef \pm 15\%.         C267           C211         Ceramic: 0.047 \text{ µF} \pm 10\% 25 \text{ VDCW}, tempcoef \pm 15\%.         C269           C211         Ceramic: 1000 \text{ pF} \pm 10\% 50 \text{ VDCW}, tempcoef \pm 15\%.         C270           C212         Polypropylene: 0.1 \text{ µF} 5\% 50 \text{ VDCW}, tempcoef \pm 15\%.         C270           C211         Ceramic: 1000 \text{ pF} \pm 10\% 50 \text{ VDCW}, tempcoef \pm 15\%.         C271           C214         Ceramic: 1000 \text{ pF} \pm 10\% 50 \text{ VDCW}, tempcoef \pm 15\%.         C272           C215         Ceramic: 1000 \text{ pF} \pm 10\% 50 \text{ VDCW}, tempcoef \pm 15\%.         C276           C214         Ceramic: 100 \text{ pF} \pm 10\% 50 \text{ VDCW}, tempcoef \pm 35\% 1000 \text{ PM}.         C277           C214         Ceramic: 100 \text{ pF} \pm $	C201	NOTE:	Ceramic: $0.047 \mu\text{F} \pm 10\% 25 \text{VDCW}.$	6247
$ \begin{array}{ccccc} C222 & \mbox{are}{reference} \\ \mbox{only}, Refer to Service able parts. \\ \label{eq:c220} C224 & \mbox{sections for serviceable parts.} \\ \label{eq:c220} C225 & \mbox{ceramic: } 0.04 \mbox{$\mu$F$ \pm 20\% 10 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 0.04 \mbox{$\mu$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 0.04 \mbox{$\mu$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 0.04 \mbox{$\mu$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 0.04 \mbox{$\mu$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{ceramic: } 0.04 \mbox{$\mu$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{ceramic: } 0.04 \mbox{$\mu$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{ceramic: } 0.04 \mbox{$\mu$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 0.04 \mbox{$\mu$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 1000 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 1000 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 1000 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 1000 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 1000 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 1000 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 100 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 100 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 100 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 100 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{temp coef \pm 15\%$.} \\ \mbox{ceramic: } 100 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{ceramic: } 100 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{ceramic: } 100 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{ceramic: } 100 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ \mbox{ceramic: } 100 \mbox{$p$F$ \pm 10\% 50 \mbox{$VDCW$,} \\ cer$		Parts listed	temp coef $\pm$ 15%.	C248
only, Refer to Service able parts.cut H300 function Prim.and C220 C220 is service able parts.cut H300 function Prim.C204Sections for service able parts.Electrolytic: 220 $\mu$ F ± 20% 10 VDCW, temp coef ± 15%.C251C205Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.C252C206Polyester: 0.47 $\mu$ F ± 20% 16 VDCW.C253C207 C210Electrolytic: 47 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.C266 and C267C211Ceramic: 0.047 $\mu$ F ± 10% 50 VDCW, temp coef ± 15%.C268C212Polypropylene: 1 $\mu$ F ± 10% 50 VDCW, temp coef ± 15%.C269C214Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C271C216Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C272C217Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C276C218 C221Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C276C222 C221Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C276C223 C224Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C278C224 C233Tantalum: 10 mF ± 20% 10 VDCW, temp coef ± 15%.C281C234 C233Electrolytic: 47 mF ± 20% 16 VDCW, temp coef ± 15%.C281C234 C233Electrolytic: 47 mF ± 20% 16 VDCW, temp coef ± 15%.C282C334 C234Electrolytic: 47 mF ± 20% 16 VDCW, temp coef ± 15%.C281C236 C233Electrolytic: 47 $\mu$ F ± 20% 16 VDCW, temp coef ± 15%.C282C334 C234Electrolytic: 47 $\mu$ F ± 20% 1	C202	reference	Ceramic: 470 pF ±5% 50 VDCW, temp	C249
Corrections for serviceable parts.         Corranic: $0.047 \ \mu F \pm 10\% \ 25 \ VDCW,$ temp coef $\pm 15\%$ .         C251           C204         serviceable parts.         Ceramic: $0.01 \ \mu F \pm 10\% \ 25 \ VDCW,$ temp coef $\pm 15\%$ .         C251           C205         Ceramic: $0.01 \ \mu F \pm 10\% \ 25 \ VDCW,$ temp coef $\pm 15\%$ .         C253           C206         Polyester: $0.47 \ \mu F \pm 20\% \ 16 \ VDCW.$ C253           C207         Electrolytic: $47 \ \mu F \pm 20\% \ 16 \ VDCW.$ C266           C210         Polypropylene: $1 \ \mu F \pm 10\% \ 25 \ VDCW,$ temp coef $\pm 15\%.$ C268           C211         Ceramic: $10.047 \ \mu F \pm 10\% \ 25 \ VDCW,$ temp coef $\pm 15\%.$ C269           C212         Polypropylene: $0.1 \ \mu F \ 50 \ VDCW,$ temp coef $\pm 15\%.$ C270           C214         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ temp coef $\pm 15\%.$ C271           C215         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ temp coef $\pm 15\%.$ C273           C216         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ temp coef $\pm 15\%.$ C276           C221         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ temp coef $\pm 15\%.$ C276           C222         Ceramic: $1000 \ pF \pm 5\% \ 50 \ VDCW,$ temp coef $\pm 15\%.$ C277           C223         Ceramic: $1000 \ pF \pm 5\% \ 50 \ VDCW,$ temp coef $\pm 20\% \ 10 \ VDCW.$ C280           C230         <	C203	only. Refer	Electrolytic: 220 $\mu$ E + 20% 10 VDCW	and
C204         Serviceable parts.         Canadiante - Dor # 1 = 10 % 25 V DCW, temp coef $\pm$ 15%.         C231           C205         Ceramic: 0.01 $\mu$ F $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.         C252           C206         Polyester: 0.47 $\mu$ F $\pm$ 20% 16 VDCW.         C253           C207         Electrolytic: 47 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.         C266           C210         Polypropylene: 1 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.         C269           C211         Ceramic: 0.047 $\mu$ F $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.         C270           C213         Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.         C271           C214         Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.         C271           C215         Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.         C272           C216         Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.         C273           C214         Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.         C276           C218         Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.         C277           C222         Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef 0 $\pm$ 30 PPM.         C278           C223         Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.         C278           C224         Tantalum: 10 mF $\pm$ 20% 16 VDCW.         C280	C204	Sections for	Coromic: 0.047 $\mu$ E + 10% 25 VDCW	C250
C205         Ceramic: $0.01 \ \mu F \pm 10\% 50 \ VDCW,$ temp coef $\pm 15\%.$ C252           C206         Polyester: $0.47 \ \mu F \pm 20\% 16 \ VDCW.$ C253           C207         Electrolytic: $47 \ \mu F \pm 20\% 16 \ VDCW.$ C266 and C267           C210         Polypropylene: $1 \ \mu F \pm 10\%.$ C268           C211         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW.$ C269           C212         Polypropylene: $0.1 \ \mu F 5\% 50 \ VDCW.$ C269           C213         Ceramic: $1000 \ p F \pm 10\% 50 \ VDCW.$ C270           C214         Ceramic: $1000 \ p F \pm 10\% 50 \ VDCW.$ C271           C215         Ceramic: $1000 \ p F \pm 10\% 50 \ VDCW.$ C271           C215         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW.$ C272           C216         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW.$ C273           C214         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW.$ C273           C215         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW.$ C274           C218         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW.$ C276           C2220         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW.$ C278           C2221         Ceramic: $0.047 \ \mu F \pm 20\% 16 \ VDCW.$ C278           C2224         Tantalum: $4.7 \ m F \pm 20\% 16 \ VDCW.$ C	0204	serviceable parts.	temp coef $\pm$ 15%.	6251
C206         Polyester: $0.47 \ \mu F \pm 5\% 50 \ VDCW.$ C253           C207         Electrolytic: $47 \ \mu F \pm 20\% 16 \ VDCW.$ C266 and C267           C210         Polypropylene: $1 \ \mu F \pm 10\%.$ C268           C211         Ceramic: $0.047 \ \mu F \pm 10\% 25 \ VDCW,$ temp coef $\pm 15\%.$ C269           C212         Polypropylene: $0.1 \ \mu F 5\% 50 \ VDCW,$ temp coef $\pm 15\%.$ C270           C213         Ceramic: 1000 pF $\pm 10\% 50 \ VDCW,$ temp coef $\pm 15\%.$ C271           C214         Ceramic: 1000 pF $\pm 10\% 50 \ VDCW,$ temp coef $\pm 15\%.$ C272           C216         Ceramic: 0.047 \ \mu F \pm 10\% 50 \ VDCW, temp coef $\pm 15\%.$ C273 and c274           C217         Ceramic: 0.047 \ \mu F \pm 10\% 50 \ VDCW, temp coef $\pm 15\%.$ C276           C218         Ceramic: 0.047 \ \mu F \pm 10\% 50 \ VDCW, temp coef $\pm 15\%.$ C276           C221         Ceramic: 0.047 \ \mu F \pm 10\% 50 \ VDCW, temp coef $\pm 15\%.$ C276           C222         Ceramic: 0.047 \ \mu F \pm 10\% 50 \ VDCW, temp coef $\pm 15\%.$ C278           C222         Ceramic: 0.047 \ \mu F \pm 10\% 50 \ VDCW, temp coef $\pm 15\%.$ C278           C223         Ceramic: 0.047 \ \mu F \pm 20\% 16 \ VDCW.         C280           C231         Electrolytic: 47 \ m F \pm 20\% 16 \ VDCW.         C281           C233         Ceramic: 10	C205		Ceramic: 0.01 $\mu$ F ± 10% 50 VDCW, temp coef ± 15%.	C252
C207 thru         Electrolytic: $47 \ \mu F \pm 20\% 16 \ VDCW.$ C266 and C267           C210         Polypropylene: $1 \ \mu F \pm 10\%$ .         C268           C211         Ceramic: $0.047 \ \mu F \pm 10\% 25 \ VDCW$ , temp coef $\pm 15\%$ .         C269           C212         Polypropylene: $0.1 \ \mu F 5\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C270           C213         Ceramic: $1000 \ pF \pm 10\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C270           C214         Ceramic: $1000 \ pF \pm 10\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C271           C215         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C273           C216         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C275           C214         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C276           C217         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C276           C221         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C276           C222         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C278           C2220         Ceramic: $0.047 \ \mu F \pm 10\% 50 \ VDCW$ , temp coef $\pm 15\%$ .         C278           C2221         Ceramic: $0.047 \ \mu F \pm 20\% 16 \ VDCW$ .         C278           C223         Ceramic: $100 \ pF \pm 10\% 50 \ VDCW$ .         C281           C230	C206		Polyester: 0.47 $\mu\text{F}$ ±5% 50 VDCW.	C253
thru C209C266 and C267C210Polypropylene: 1 $\mu$ F ± 10%.C211Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.C212Polypropylene: 0.1 $\mu$ F 5% 50 VDCW, temp coef ± 15%.C213Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C214Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C215Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C216Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.C218Ceramic: 0.047 $\mu$ F ± 10% 50 VDCW, temp coef ± 15%.C220Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C221Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.C222Ceramic: 100 pF ± 5% 50 VDCW, temp coef ± 15%.C223Ceramic: 100 pF ± 5% 50 VDCW, temp coef ± 5% 50 VDCW, temp coef 350 100 PPM.C224Tantalum: 10 mF ± 20% 16 VDCW. C281C230Polyester: 0.1 mF ± 5% 50 VDCW, temp coef ± 15%.C231Electrolytic: 47 mF ± 20% 16 VDCW. C282C231Electrolytic: 47 $\mu$ F ± 20% 16 VDCW. C283C233Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C234Electrolytic: 47 $\mu$ F ± 20% 16 VDCW. C284C235Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C236Electrolytic: 47 $\mu$ F ± 20% 16 VDCW. C283C236Electrolytic: 47 $\mu$ F ± 20% 16 VDCW, temp coef ± 15%.C236Electrolytic: 47 $\mu$ F ± 20% 16 VDCW, temp coef 0 ± 30 PPM.C242Ceramic: 6 pF ± 0.5 pF 50 VDCW, temp coef 0 ± 30 PPM.C242Ceramic: 6 pF ± 0.5 pF 50 VDCW, temp coef 0	C207		Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW.	
C200Polypropylene: 1 $\mu$ F ± 10%.C267C210Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.C268C212Polypropylene: 0.1 $\mu$ F 5% 50 VDCW, temp coef ± 15%.C269C213Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C270C214Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C271C215Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C271C216Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C272C217Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C276C220Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C276C221Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.C276C222Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.C278C223Ceramic: 820 pF ±5% 50 VDCW, temp coef 350-1000 PPM.C280 and c281C230Polyester: 0.1 mF ±20% 16 VDCW. temp coef ±15%.C280 and c283C231Electrolytic: 47 mF ± 20% 16 VDCW. temp coef ±15%.C283 c283C234Electrolytic: 47 $\mu$ F ± 20% 16 VDCW. temp coef ± 15%.C283 c284C234Electrolytic: 47 $\mu$ F ± 20% 16 VDCW. temp coef ± 15%.C286 c286C234Electrolytic: 47 $\mu$ F ± 20% 16 VDCW. temp coef ± 15%.C283 c284C234Electrolytic: 47 $\mu$ F ± 20% 16 VDCW. temp coef ± 15%.C283 c283C234Electrolytic: 47 $\mu$ F ± 20% 16 VDCW. temp coef ± 30 PPM.C286 c288C234Ceramic: 7 pF ± 0.5 pF 50 VDCW, temp coef 0 ± 30 PPM.C288 c293 </td <td>thru C200</td> <td></td> <td></td> <td>C266</td>	thru C200			C266
CallCorranic: $0.047 \mu F \pm 10\%$ .C268C211Ceramic: $0.047 \mu F \pm 10\%$ 25 VDCW, temp coef $\pm 15\%$ .C269C212Polypropylene: $0.1 \mu F 5\%$ 50 VDCW, temp coef $\pm 15\%$ .C270C214Ceramic: $1000 pF \pm 10\%$ 50 VDCW, temp coef $\pm 15\%$ .C271C215Ceramic: $1000 pF \pm 10\%$ 50 VDCW, temp coef $\pm 15\%$ .C271C216Ceramic: $0.047 \mu F \pm 10\%$ 50 VDCW, temp coef $\pm 15\%$ .C273 and and C217C218Ceramic: $1000 pF \pm 10\%$ 50 VDCW, temp coef $\pm 15\%$ .C276C220Ceramic: $1000 pF \pm 10\%$ 50 VDCW, temp coef $\pm 15\%$ .C276C221Ceramic: $0.047 \mu F \pm 10\%$ 25 VDCW, temp coef $\pm 15\%$ .C276C222Ceramic: $0.047 \mu F \pm 10\%$ 25 VDCW, temp coef $\pm 15\%$ .C276C223Ceramic: $0.047 \mu F \pm 10\%$ 25 VDCW, temp coef $\pm 15\%$ .C278C224Ceramic: $0.047 \mu F \pm 20\%$ 10 VDCW. temp coef $350 \cdot 1000$ PPM.C280 and and c273C224Tantalum: 10 mF $\pm 20\%$ 10 VDCW. temp coef $30$ PPM.C281C233Ceramic: 1000 pF $\pm 10\%$ 50 VDCW, temp coef $\pm 15\%$ .C282C234Electrolytic: $47 \mu F \pm 20\%$ 16 VDCW. temp coef $\pm 15\%$ .C285C236Electrolytic: $47 \mu F \pm 20\%$ 16 VDCW, temp coef $\pm 15\%$ .C286 thruC236Electrolytic: $47 \mu F \pm 20\%$ 16 VDCW, temp coef $\pm 15\%$ .C286C234Electrolytic: $47 \mu F \pm 20\%$ 16 VDCW, temp coef $\pm 30$ PPM.C286C336Electrolytic: $47 \mu F \pm 0.5 pF$ 50 VDCW, temp coef $0 \pm 30$ PPM.C288C336Electrolytic: $7p F \pm 0.5 pF$	C210		Polypropylene: $1 \mu F + 10\%$	C267
C211Default: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.C269C212Polypropylene: 0.1 $\mu$ F 5% 50 VDCW, temp coef ± 15%.C270C213Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C271C214Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C271C215Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.C272C216Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.C273 	C211		Coromic: $0.047\mu E \pm 10\% 25 VDCW$	C268
C212         Polypropylene: $0.1 \ \mu$ F 5% 50 VDCW.         C269           C213         Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.         C270           C214         Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.         C271           C215         Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ± 15%.         C272           C216         Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.         C273 and C274           C218         Ceramic: 0.047 $\mu$ F ± 10% 50 VDCW, temp coef ± 15%.         C276           C220         Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.         C276           C221         Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.         C276           C222         Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.         C276           C223         Ceramic: 820 pF ±5% 50 VDCW, temp coef 350-1000 PPM.         C278           C224         Tantalum: 10 mF ± 20% 10 VDCW.         C280 and C281           C230         Polyester: 0.1 mF ± 20% 16 VDCW.         C282           C331         Electrolytic: 47 mF ± 20% 16 VDCW.         C283 and C284           C234         Electrolytic: 47 $\mu$ F ± 20% 16 VDCW.         C285           C335         Ceramic: 1000 pF ± 10% 50 VDCW, temp coef 15%.         C286           C235         Ceramic: 1000 pF ± 10% 50 VDCW, temp coef 0 ± 30 PPM.         C286	0211		temp coef $\pm$ 15%.	
C213       Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.       C270         C214       Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.       C271         C215       Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.       C272         C216       Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.       C273 and C274         C218       Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.       C275         C220       Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.       C276         C221       Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.       C276         C222       Ceramic: 100 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.       C278         C223       Ceramic: 820 pF $\pm$ 5% 50 VDCW, temp coef $\pm$ 30 PPM.       C280 and and C280       C280 and C281         C224       Tantalum: 10 mF $\pm$ 20% 10 VDCW.       C281       C280 and C281       C280 C281         C230       Polyester: 0.1 mF $\pm$ 20% 16 VDCW.       C282       C283 C284       C283 C284       C283         C234       Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW, temp coef $\pm$ 15%.       C285       C286       C284         C234       Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW, temp coef $\pm$ 15%.       C285       C286       C286         C234       Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW, temp coef $\pm$ 30 PPM.       C288       C286 <td>C212</td> <td></td> <td>Polypropylene: 0.1 µF 5% 50 VDCW.</td> <td>C269</td>	C212		Polypropylene: 0.1 µF 5% 50 VDCW.	C269
C214Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C271C215 and C216Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C272C217Ceramic: 0.047 µF $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C273 and C274C218 thruCeramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C276C220Ceramic: 0.047 µF $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C221Ceramic: 0.047 µF $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C222Ceramic: 0.047 µF $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C221Ceramic: 10.047 µF $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C222Ceramic: 100 pF $\pm$ 5% 50 VDCW, temp coef 0 $\pm$ 30 PPM.C278C223Ceramic: 820 pF $\pm$ 5% 50 VDCW, temp coef 350-1000 PPM.C280 and and C281C224Tantalum: 10 mF $\pm$ 20% 10 VDCW.C281C230Polyester: 0.1 mF $\pm$ 5% 50 VDCW, temp coef $\pm$ 15%.C283 and and C283C231Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C283 and c284C234Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C285C236Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C286 thru C286C236Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C286 thru C288C236Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C286 thru C288C236Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C288 C288C236Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C288 C288C236Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C288 C288C241 <t< td=""><td>C213</td><td></td><td>Ceramic:1000 pF <math>\pm</math> 10% 50 VDCW, temp coef <math>\pm</math> 15%.</td><td>C270</td></t<>	C213		Ceramic:1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.	C270
C215 and C216Ceramic: 100 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C272C216Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C273 and C274C218Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C275C220Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C221Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C222Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C222Ceramic: 0.047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C223Ceramic: 100 pF $\pm$ 5% 50 VDCW, temp coef 350-1000 PPM.C279C224Tantalum: 10 mF $\pm$ 20% 10 VDCW.C280 and c281C230Polyester: 0.1 mF $\pm$ 20% 16 VDCW.C281C231Electrolytic: 47 mF $\pm$ 20% 16 VDCW.C283 and c284C233Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW.C283 and c284C234Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW.C285 c284C235Ceramic:1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C286 thruC236Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW.C286 thruC242Ceramic: 7 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.C293C242Ceramic: 7 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.C293C242Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW, 	C214		Ceramic:1000 pF ± 10% 50 VDCW,	C271
C213 contentC213 temp coef $\pm$ 15%.C272 contentC216 C217Ceramic: 0.047 µF $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C273 and C274C218 C220 C221Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C276C221 C222Ceramic: 0.047 µF $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C222 C223Ceramic: 100 pF $\pm$ 5% 50 VDCW, temp coef 0 $\pm$ 30 PPM.C278C223 C224 C225 C230Ceramic: 820 pF $\pm$ 5% 50 VDCW, temp coef 350-1000 PPM.C279C224 C230 C231Tantalum: 10 mF $\pm$ 20% 10 VDCW.C280 and C281C230 C232 C231 C233 C233 C234 C234 C234 C234 C235 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C236 C237 C236 C236 C236 C237 C237 C237 C238 C238 C239 C239 C239 C230 C230 C230 C230 C230 C231C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C230 C23	C215		Ceramic: 1000 pE + 10% 50 VDCW	
C216Ceramic: $0.047 \ \mu\text{F} \pm 10\% 25 \ \text{VDCW}$ , temp coef $\pm 15\%$ .C273 and C274C218Ceramic: $1000 \ \text{F} \pm 10\% 50 \ \text{VDCW}$ , temp coef $\pm 15\%$ .C275C220Ceramic: $0.047 \ \mu\text{F} \pm 10\% 25 \ \text{VDCW}$ , temp coef $\pm 15\%$ .C276C221Ceramic: $0.047 \ \mu\text{F} \pm 10\% 25 \ \text{VDCW}$ , temp coef $\pm 15\%$ .C276C222Ceramic: $100 \ \text{pF} \pm 5\% 50 \ \text{VDCW}$ , temp coef $0\pm 30 \ \text{PPM}$ .C278C223Ceramic: $820 \ \text{pF} \pm 5\% 50 \ \text{VDCW}$ , temp coef $350 \ 1000 \ \text{PPM}$ .C279C224Tantalum: $10 \ \text{mF} \pm 20\% \ 10 \ \text{VDCW}$ .C280 and C281C230Polyester: $0.1 \ \text{mF} \pm 20\% \ 16 \ \text{VDCW}$ .C282C231Electrolytic: $47 \ \text{mF} \pm 20\% \ 16 \ \text{VDCW}$ .C283 c284C234Electrolytic: $47 \ \mu\text{F} \pm 20\% \ 16 \ \text{VDCW}$ .C284C235Ceramic: $1000 \ \text{pF} \pm 10\% \ 50 \ \text{VDCW}$ , temp coef $\pm 15\%$ .C285C234Electrolytic: $47 \ \mu\text{F} \pm 20\% \ 16 \ \text{VDCW}$ .C285C235Ceramic: $1000 \ \text{pF} \pm 10\% \ 50 \ \text{VDCW}$ , temp coef $\pm 15\%$ .C285C236Electrolytic: $47 \ \mu\text{F} \pm 20\% \ 16 \ \text{VDCW}$ .C286C241Ceramic: $7 \ \text{pF} \pm 0.5 \ \text{pF} \ 50 \ \text{VDCW}$ , temp coef $0 \pm 30 \ \text{PM}$ .C293C242Ceramic: $6 \ \text{pF} \pm 0.5 \ \text{pF} \ 50 \ \text{VDCW}$ , temp coef $0 \pm 30 \ \text{PM}$ .C298	and		temp coef $\pm$ 15%.	C272
C217Ceramic: $0.047 \ \mu$ F $\pm 10\% 25 \ VDCW, temp coef \pm 15\%.and C274C218Ceramic: 1000 \ pF \pm 10\% 50 \ VDCW, temp coef \pm 15\%.C275C220Ceramic: 0.047 \ \muF \pm 10\% 25 \ VDCW, temp coef \pm 15\%.C276C221Ceramic: 100 \ pF \pm 5\% 50 \ VDCW, temp coef \pm 15\%.C278C222Ceramic: 100 \ pF \pm 5\% 50 \ VDCW, temp coef \pm 330 \ PPM.C279C223Ceramic: 820 \ pF \pm 5\% 50 \ VDCW, temp coef 350 \ 1000 \ PPM.C279C224Tantalum: 10 \ mF \pm 20\% \ 10 \ VDCW.C280C230Polyester: 0.1 \ mF \pm 20\% \ 16 \ VDCW.C282C231Electrolytic: 47 \ mF \pm 20\% \ 16 \ VDCW.C283C232Ceramic: 1000 \ pF \pm 10\% \ 50 \ VDCW, temp coef \pm 15\%.C283C234Electrolytic: 47 \ \muF \pm 20\% \ 16 \ VDCW.C284C235Ceramic: 1000 \ pF \pm 10\% \ 50 \ VDCW, temp coef \pm 15\%.C285C236Electrolytic: 47 \ \muF \pm 20\% \ 16 \ VDCW.C285C241Ceramic: 7 \ pF \pm 0.5 \ pF \ 50 \ VDCW, temp coef \ \pm 30 \ PPM.C286C242Ceramic: 6 \ pF \pm 0.5 \ pF \ 50 \ VDCW, temp coef \ 0 \pm 30 \ PPM.C293C242Ceramic: 6 \ pF \pm 0.5 \ pF \ 50 \ VDCW, temp coef \ 0 \pm 30 \ PPM.C298$	0216			C273
C218 thruCeramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C274 C275C220 C221Ceramic: 0.0047 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.C276C222Ceramic: 100 pF $\pm$ 5% 50 VDCW, temp coef 0 $\pm$ 30 PPM.C278C223Ceramic: 820 pF $\pm$ 5% 50 VDCW, temp coef 350-1000 PPM.C279C224Tantalum: 10 mF $\pm$ 20% 10 VDCW.C280 and c281C230Polyester: 0.1 mF $\pm$ 20% 16 VDCW.C281C231Electrolytic: 47 mF $\pm$ 20% 16 VDCW.C283 and c284C234Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW, temp coef $\pm$ 15%.C285C236Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW, temp coef 0 $\pm$ 30 PPM.C286 thruC242Ceramic: 7 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.C283 c293C242Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.C298C293C298C298	C217		Ceramic: $0.047 \ \mu\text{F} \pm 10\% \ 25 \ \text{VDCW},$ temp coef ±15%.	and
C210 C220 C221Ceramic: $1000000000000000000000000000000000000$	C218		Ceramic: 1000 pE + 10% 50 VDCW	C274
C220       Ceramic: $0.047 \ \mu\text{F} \pm 10\% \ 25 \ \text{VDCW}$ , temp coef $\pm 15\%$ .       C276         C222       Ceramic: $100 \ \text{pF} \pm 5\% \ 50 \ \text{VDCW}$ , temp coef $0 \pm 30 \ \text{PPM}$ .       C278         C223       Ceramic: $820 \ \text{pF} \pm 5\% \ 50 \ \text{VDCW}$ , temp coef $350 \ \text{1000 \ PPM}$ .       C279         C224       Tantalum: $10 \ \text{mF} \pm 20\% \ 10 \ \text{VDCW}$ .       C280 and and and and c281         C230       Polyester: $0.1 \ \text{mF} \pm 20\% \ 16 \ \text{VDCW}$ .       C282         C231       Electrolytic: $47 \ \text{mF} \pm 20\% \ 16 \ \text{VDCW}$ .       C283 and C283         C232       Ceramic: $1000 \ \text{pF} \pm 10\% \ 50 \ \text{VDCW}$ , temp coef $\pm 15\%$ .       C283         C234       Electrolytic: $47 \ \text{mF} \pm 20\% \ 16 \ \text{VDCW}$ .       C283 and C284         C234       Electrolytic: $47 \ \text{mF} \pm 20\% \ 16 \ \text{VDCW}$ .       C285         C234       Electrolytic: $47 \ \text{mF} \pm 20\% \ 16 \ \text{VDCW}$ .       C285         C235       Ceramic: $1000 \ \text{pF} \pm 10\% \ 50 \ \text{VDCW}$ , temp coef $\pm 15\%$ .       C285         C236       Electrolytic: $47 \ \text{mF} \pm 20\% \ 16 \ \text{VDCW}$ .       C288         C241       Ceramic: $7 \ \text{pF} \pm 0.5 \ \text{pF} 50 \ \text{VDCW}$ , temp coef $0 \pm 30 \ \text{PPM}$ .       C293         C242       Ceramic: $6 \ \text{pF} \pm 0.5 \ \text{pF} 50 \ \text{VDCW}$ , temp coef $0 \pm 30 \ \text{PPM}$ .       C298	thru		temp coef $\pm$ 15%.	C275
C221         Ceramic: $0.047 \ \mu F \pm 10\% \ 25 \ VDCW,$ temp coef $\pm 15\%$ .         C278           C222         Ceramic: $100 \ pF \pm 5\% \ 50 \ VDCW,$ temp coef $0\pm 30 \ PPM$ .         C278           C223         Ceramic: $820 \ pF \pm 5\% \ 50 \ VDCW,$ temp coef $350-1000 \ PPM$ .         C279           C224         Tantalum: $10 \ mF \pm 20\% \ 10 \ VDCW.$ C280 and C281           C230         Polyester: $0.1 \ mF \pm 20\% \ 16 \ VDCW.$ C282           C231         Electrolytic: $47 \ mF \pm 20\% \ 16 \ VDCW.$ C283 and C284           C234         Electrolytic: $47 \ mF \pm 20\% \ 16 \ VDCW.$ C283 and C284           C235         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ temp coef $\pm 15\%$ .         C285           C236         Electrolytic: $47 \ \muF \pm 20\% \ 16 \ VDCW.$ C285           C235         Ceramic: $1000 \ pF \pm 10\% \ 50 \ VDCW,$ temp coef $\pm 15\%$ .         C286           C236         Electrolytic: $47 \ \muF \pm 20\% \ 16 \ VDCW.$ C285           C236         Electrolytic: $47 \ \muF \pm 20\% \ 16 \ VDCW.$ C286           C241         Ceramic: $7 \ pF \pm 0.5 \ pF \ 50 \ VDCW,$ temp coef $0 \pm 30 \ PPM.$ C293           C242         Ceramic: $6 \ pF \pm 0.5 \ pF \ 50 \ VDCW,$ temp coef $0 \pm 30 \ PPM.$ C298           C242         Ceramic: $6 \ pF \pm 0.5 \ pF \ 50 \ VDCW,$ temp coef $0 \pm 30 \ PPM.$ C298	C220			C276
C222Caramic: 100 pF $\pm 5\%$ 50 VDCW, temp coef 0 $\pm 30$ PPM.C278C223Ceramic: 820 pF $\pm 5\%$ 50 VDCW, temp coef 350-1000 PPM.C279C224Tantalum: 10 mF $\pm 20\%$ 10 VDCW.C280 andC225Tantalum: 4.7 mF $\pm 20\%$ 16 VDCW.C281C230Polyester: 0.1 mF $\pm 5\%$ 50 VDCW.C282C231Electrolytic: 47 mF $\pm 20\%$ 16 VDCW.C283C232Ceramic: 1000 pF $\pm 10\%$ 50 VDCW, temp coef $\pm 15\%$ .C283C234Electrolytic: 47 µF $\pm 20\%$ 16 VDCW.C285C236Electrolytic: 47 µF $\pm 20\%$ 16 VDCW.C286C236Electrolytic: 47 µF $\pm 20\%$ 16 VDCW.C286C241Ceramic: 7 pF $\pm 0.5$ pF 50 VDCW, temp coef 0 $\pm 30$ PPM.C293C242Ceramic: 6 pF $\pm 0.5$ pF 50 VDCW, temp coef 0 $\pm 30$ PPM.C298C201C284C298	C221		Ceramic: 0.047 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.	0210
C223Coef $0\pm 30$ PPM.C279C224Ceramic: $820$ pF $\pm 5\%$ 50 VDCW, temp coef $350-1000$ PPM.C280 andC225Tantalum: $10$ mF $\pm 20\%$ 10 VDCW.C281C230Polyester: $0.1$ mF $\pm 5\%$ 50 VDCW.C282C231Electrolytic: $47$ mF $\pm 20\%$ 16 VDCW.C283C232Ceramic: $1000$ pF $\pm 10\%$ 50 VDCW,C283C233Electrolytic: $47$ µF $\pm 20\%$ 16 VDCW.C283C234Electrolytic: $47$ µF $\pm 20\%$ 16 VDCW.C285C235Ceramic: $1000$ pF $\pm 10\%$ 50 VDCW, temp coef $\pm 15\%$ .C286C236Electrolytic: $47$ µF $\pm 20\%$ 16 VDCW.C286C241Ceramic: $7$ pF $\pm 0.5$ pF 50 VDCW, temp coef $0 \pm 30$ PPM.C293C242Ceramic: $6$ pF $\pm 0.5$ pF 50 VDCW, temp coef $0 \pm 30$ PPM.C293C293Ceramic: $6$ pF $\pm 0.5$ pF 50 VDCW, temp coef $0 \pm 30$ PPM.C293	C222		Ceramic: 100 pF ±5% 50 VDCW, temp	C278
C223Ceramic: $820 \text{ pF} \pm 5\% 50 \text{ VDCW}$ , temp coef $350-1000 \text{ PPM}$ .C279C224Tantalum: $10 \text{ mF} \pm 20\% 10 \text{ VDCW}$ .C280 and C281C225Tantalum: $4.7 \text{ mF} \pm 20\% 16 \text{ VDCW}$ .C281C230Polyester: $0.1 \text{ mF} \pm 5\% 50 \text{ VDCW}$ .C282C231Electrolytic: $47 \text{ mF} \pm 20\% 16 \text{ VDCW}$ .C283 and C282C232Ceramic: $1000 \text{ pF} \pm 10\% 50 \text{ VDCW}$ , temp coef $\pm 15\%$ .C283 and C284C234Electrolytic: $47 \text{ µF} \pm 20\% 16 \text{ VDCW}$ .C285C236Electrolytic: $47 \text{ µF} \pm 20\% 16 \text{ VDCW}$ , temp coef $\pm 15\%$ .C286 			coef 0±30 PPM.	0.070
C224Tantalum: 10 mF $\pm$ 20% 10 VDCW.C280 andC225Tantalum: 4.7 mF $\pm$ 20% 16 VDCW.C281C230Polyester: 0.1 mF $\pm$ 5% 50 VDCW.C282C231Electrolytic: 47 mF $\pm$ 20% 16 VDCW.C282C232Ceramic: 1000 pF $\pm$ 10% 50 VDCW,C283and C233temp coef $\pm$ 15%.C284C234Electrolytic: 47 µF $\pm$ 20% 16 VDCW,C285C235Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C286C236Electrolytic: 47 µF $\pm$ 20% 16 VDCW, temp coef 0 $\pm$ 30 PPM.C288C242Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.C298C201C201C201	C223		Ceramic: 820 pF ±5% 50 VDCW, temp coef 350-1000 PPM.	6279
C225Tantalum: 4.7 mF $\pm$ 20% 16 VDCW.C281C230Polyester: 0.1 mF $\pm$ 5% 50 VDCW.C282C231Electrolytic: 47 mF $\pm$ 20% 16 VDCW.C282C232Ceramic: 1000 pF $\pm$ 10% 50 VDCW,C283and c233temp coef $\pm$ 15%.C284C234Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C285C235Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.C285C236Electrolytic: 47 µF $\pm$ 20% 16 VDCW.C286C241Ceramic: 7 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.C293C242Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.C298C2001C2001C2001	C224		Tantalum: 10 mF $\pm$ 20% 10 VDCW.	C280
C230       Polyester: $0.1 \text{ mF} \pm 5\% 50 \text{ VDCW}.$ C282         C231       Electrolytic: $47 \text{ mF} \pm 20\% 16 \text{ VDCW}.$ C283         C232       Ceramic: $1000 \text{ pF} \pm 10\% 50 \text{ VDCW},$ C283         c233       Ceramic: $1000 \text{ pF} \pm 10\% 50 \text{ VDCW},$ C283         c234       Electrolytic: $47 \text{ µF} \pm 20\% 16 \text{ VDCW}.$ C285         C235       Ceramic: $1000 \text{ pF} \pm 10\% 50 \text{ VDCW},$ C285         C236       Electrolytic: $47 \text{ µF} \pm 20\% 16 \text{ VDCW}.$ C286         C241       Ceramic: $7 \text{ pF} \pm 0.5 \text{ pF} 50 \text{ VDCW},$ C288         C242       Ceramic: $6 \text{ pF} \pm 0.5 \text{ pF} 50 \text{ VDCW},$ C293         C242       Ceramic: $6 \text{ pF} \pm 0.5 \text{ pF} 50 \text{ VDCW},$ C298	C225		Tantalum: 4.7 mF ± 20% 16 VDCW	and C281
C231       Electrolytic: 47 mF $\pm$ 20% 16 VDCW.       C283 and C283         C232       Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.       C283 and C284         C234       Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW.       C285         C235       Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.       C286         C236       Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW.       C286         C241       Ceramic: 7 pF $\pm$ 0.5 pF 50 VDCW, temp coef $0 \pm$ 30 PPM.       C293         C242       Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW, temp coef $0 \pm$ 30 PPM.       C298	C230		Polvester: 0.1 mF +5% 50 VDCW	C282
C232       Ceramic: 1000 pF $\pm$ 10% 10 VDOW.       C283         C233       Ceramic: 1000 pF $\pm$ 10% 50 VDCW,       c284         C234       Electrolytic: 47 µF $\pm$ 20% 16 VDCW.       C285         C235       Ceramic: 1000 pF $\pm$ 10% 50 VDCW,       C285         C236       Electrolytic: 47 µF $\pm$ 20% 16 VDCW.       C286         C241       Ceramic: 7 pF $\pm$ 0.5 pF 50 VDCW,       C288         C242       Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW,       C293         C242       Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW,       C298         C242       Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW,       C298	C231		Electrolytic: $47 \text{ mE} + 20\% 16 \text{ VDCW}$	
C232       Ceramic. 1000 pr $\pm$ 10% 30 VDCW, temp coef ±15%.       and C284         C233       Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW.       C285         C235       Ceramic:1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.       C286         C236       Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW.       C286         C241       Ceramic: 7 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.       C293         C242       Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.       C293	C232		Ceramic: 1000 pE + 10% 50 VDCW.	C283
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	and		temp coef $\pm 15\%$ .	and C284
$ \begin{array}{c cccc} C234 & & & Electrolytic: 47 \ \mu F \pm 20\% \ 16 \ VDCW. \\ C235 & & Ceramic: 1000 \ pF \pm 10\% \ 50 \ VDCW, \\ temp \ coef \ \pm 15\%. \\ C236 & & Electrolytic: 47 \ \mu F \pm 20\% \ 16 \ VDCW. \\ C241 & & Ceramic: 7 \ pF \ \pm 0.5 \ pF \ 50 \ VDCW, \\ temp \ coef \ 0 \ \pm \ 30 \ PPM. \\ C293 \\ C242 & & Ceramic: 6 \ pF \ \pm 0.5 \ pF \ 50 \ VDCW, \\ temp \ coef \ 0 \ \pm \ 30 \ PPM. \\ C298 \\ C298 \\ C291 \\$	C233			
$ \begin{array}{c cccc} C235 & Ceramic:1000 \ pF \pm 10\% \ 50 \ VDCW, \\ temp \ coef \pm 15\%. \\ C236 & Electrolytic: 47 \ \muF \pm 20\% \ 16 \ VDCW. \\ C241 & Ceramic: 7 \ pF \pm 0.5 \ pF \ 50 \ VDCW, \\ temp \ coef \ 0 \pm 30 \ PPM. \\ C293 \\ C242 & Ceramic: 6 \ pF \pm 0.5 \ pF \ 50 \ VDCW, \\ temp \ coef \ 0 \pm 30 \ PPM. \\ C298 \\ C298 \\ C290 \\ C200 \\ \end{array} $	C234		Electrolytic: 47 $\mu$ F $\pm$ 20% 16 VDCW.	C285
$ \begin{array}{c cccc} C236 & Electrolytic: 47 \ \mu F \pm 20\% \ 16 \ VDCW. \\ C241 & Ceramic: 7 \ pF \pm 0.5 \ pF \ 50 \ VDCW, \\ temp \ coef \ 0 \pm 30 \ PPM. \\ \hline C293 \\ C242 & Ceramic: 6 \ pF \pm 0.5 \ pF \ 50 \ VDCW, \\ temp \ coef \ 0 \pm 30 \ PPM. \\ \hline C298 \\ \hline C298 \\ \hline C291 \\ \hline C2001 $	C235		Ceramic:1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.	0205
C241         Ceramic: 7 pF ± 0.5 pF 50 VDCW, temp coef 0 ± 30 PPM.         C288 C293           C242         Ceramic: 6 pF ± 0.5 pF 50 VDCW, temp coef 0 ± 30 PPM.         C298           C298         C298	C236		Electrolytic: 47 $\mu\text{F}\pm20\%$ 16 VDCW.	C286 thru
C242         temp coef 0 ± 30 PPM.         C293           Ceramic: 6 pF ± 0.5 pF 50 VDCW, temp coef 0 ± 30 PPM.         C298	C241		Ceramic: 7 pF $\pm$ 0.5 pF 50 VDCW,	C288
C242 Ceramic: 6 pF ± 0.5 pF 50 VDCW, temp coef 0 ± 30 PPM. C298			temp coef 0 ± 30 PPM.	C293
C2001	C242		Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW,	
C2001		<u> </u>		L C298
				C2001

SYMBOL	PART NO.	DESCRIPTION
C244		Ceramic: 4 pF $\pm$ 0.25 pF 50 VDCW, temp coef -750 $\pm$ 120 PPM.
C245		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C246 and C247		Ceramic: 15 pF $\pm$ 5% 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C248		Ceramic: 2 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C249 and C250		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C251		Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C252		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C253		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C266 and C267		Ceramic: 5 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C268		Ceramic: 1 pF ± 0.25 pF 50 VDCW, temp coef 0±30 PPM.
C269		Ceramic: 5 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C270		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C271		Ceramic: 1 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C272		Ceramic: 2 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C273 and C274		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef 15%.
C275		Ceramic: 7 pF ± 0.5 pF 50 VDCW, temp coef -750+120 PPM.
C276		Ceramic: 1 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C278		Ceramic: 8 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C279		Ceramic: 3 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C280 and C281		Ceramic: 12 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C282		Ceramic: 1 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.
C283 and C284		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C285		Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW,
C286 thru		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C288 C293		Ceramic: 1000 pF ± 10% 50 VDCW, temp coef ±15 %
C298		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15 %.
C2001		Tantalum: 10 $\mu$ F ± 20% 10 VDCW.

## PARTS LIST

SYMBOL	PART NO.	DESCRIPTION	SYMBO
C2101		Ceramic: 3 pF $\pm$ 0.25 pF 50 VDCW. temp	IC206
02204		coef 0±30 PPM.	10207
62304		coef $\pm$ 15%.	16207
C2701		Ceramic: 5 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0±30 PPM.	IC230
C2702		Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.	
C2703		Ceramic: 5 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.	L201 L240
C2704		Ceramic: 1 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 30 PPM.	and L241
C2705		Ceramic: 5 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0+30 PPM.	L242
C2706		Ceramic: 1000 pF ± 10% 50 VDCW, temp	L243 L244
			L245
		DIODES	L249
CD201		Zener: 4.7 V; sim to HITACHI HZM3.9NB2.	L270
CD202		Silicon: fast recovery (2 diodes in series); sim to TOSHIBA 1SS226.	L271
CD203		Zener: 3.0 V; sim to HITACHI HZK3B.	L272
CD204		Silicon: fast recovery (2 diodes in series);	L273
CD205		Silicon: fast recovery (2 diodes with anote	L274
00200		Common); sim to TOSHIBA 1SS181.	1 276
CD240		Silicon: Variable Capacitance Diode; sim	1 279
thru CD243		to HITACHI HVU351.	1.280
CD247		Silicon: Schottky Barrier Diode: sim to	1 281
		HITACHI HSU88.	LZOT
CD271		Silicon: fast recovery (2 diodes in series); sim to PANASONIC MA153A.	R201
CD272		Silicon: Variable Capacitance Diode; sim to HITACHI HVU202.	R202
CD273 thru		Silicon: Variable Capacitance Diode; sim to HITACHI HVU351.	
CD276 CD277 and		Silicon: Epitaxial Planer Diode: sim to	R203
CD278 CD283		Silicon: Schottky Barrier Diode: sim to	R204
		HITACHI HSU88.	R205
0.400.4		VARIABLE CAPACITOR	Page
CV201 and		Variable: 10 pF max.	R200
CV202			R207
FL204		FILTER EMI Filter.	R208
			R209
IC201		Synthesizer: CMOS serial input; sim to	R210
IC202		Linear, Dual OP Amp; sim to MITSUBISHI	R211
IC203		Linear, Dual OP Amp; sim to NEW JRC	R213
IC204		Digital, Bilateral switch: sim to	R214
IC205		MŎTOROLA MC14066BF. Prescaler: sim to MOTOROLA	R215
		MC12022SLAD.	

\*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PART NO.	DESCRIPTION
	RF wide band amplifier: sim to NECμPC1675G.
	Linear: Dual Comparator; sim to MITSUBISHI M5233FP.
	Linear: Positive Voltage Regulator; sim to PANASONIC AN6541.
	COILS
	Choke Coil: $10 \mu\text{H} \pm 10\%$ .
	Choke Coll: 0.18 $\mu$ H $\pm$ 10%.
	Coil: Dielectric resonator.
	Choke Coil: $0.47 \mu\text{H} \pm 10\%$ .
	Choke Coll: 0.18 µF ± 10%.
	Choke Coll. 33 III $\pm$ 10%.
	Choke Coil: 0.18 $\mu$ H + 10%.
	Coil: Dielectric resonator.
	Choke Coil: 0.47 $\mu H \pm 10\%.$
	Choke Coil: 0.18 $\mu H \pm$ 10%.
	Choke Coil: 33 nH $\pm$ 10%.
	Choke Coil: 0.18 $\mu H \pm$ 10%.
	Choke Coil: 33 nH $\pm$ 10%.
	Coil: RF 19 nH $\pm$ 10%.
	Coll: RF 4.7 $\mu$ H ± 10%.
	RESISTORS
	Metal film: 10K ohms ±5%, 50 VDCW, 1/16 Watt.
	Metal film: 22 ohms ±5%, 100 VDCW, 1/10 Watt.
	Metal film: 150K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.
	Metal film: 680K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.
	Metal film: 150K ohms ±5%, 100 VDCW, 1/10 Watt.
	Metal film: 2.2K ohms ±5%, 50 VDCW, 1/16 Watt.
	Metal film: 1M ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.
	Metal film: 2.2K onms ±5%, 50 VDCW, 1/16 Watt.
	Metal film: 100 onms ±5%, 50 VDCW, 1/16 Watt.
	Nietal IIIII. 470K Onms ±5%, 50 VDCW, 1/16 Watt.
	Metal IIIII. TOUK OHNS ±5%, 50 VDCW, 1/16 Watt.
	Metal film: 330 obms +5% 200 \/DC\//
	1/4 Watt.
	Nietai film: 10K onms $\pm$ 5% 100 VDCW, 1/10 Watt.

		1	<del> </del>
PART NO.	DESCRIPTION		S
	Metal film: 150K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 6.8K ohms ±5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 3.3K ohms ±5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 15 ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 10K ohms ±5%, 50 VDCW, 1/16 Watt.		R2
			R2
	Metal film: 47 ohms ±5%, 100 VDCW, 1/10 Watt.		R2
	Metal film: 0 ohm.		
	Metal film: 220K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 18K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 2.7K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 22K ohms ±5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 1.5K ohms ±5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 22K ohms ±5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 100K ohms ±5%, 50 VDCW, 1/16 Watt.		R2
	Metal film: 10K ohms ±5%, 50 VDCW, 1/16 Watt.		R2
			R2
	Metal film: 270K ohms ±5%, 100 VDCW, 1/10 Watt.		an R2
	Metal film: 2.2K ohms ±5%, 100 VDCW, 1/10 Watt.		R2
	Metal film: 6.8K ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.		R2
	Metal film: 2.2K ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.		R2
	Metal film: 150 ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.		R2

Metal film: 5.6K ohms  $\pm$ 5%, 100 VDCW,

Metal film: 1.5K ohms ±5%, 100 VDCW,

Metal film: 120 ohms ±5%, 100 VDCW, 1/10 Watt.

Metal film: 470 ohms ±5%,100 VDCW,

Metal film: 470 ohms ±5%, 100 VDCW, 1/10 Watt.

Metal film: 220 ohms ±5%, 100 VDCW,

Metal film: 100 ohms ±5%, 100 VDCW,

Metal film: 100K ohms ±5%, 100 VDCW,

Metal film: 33K ohms  $\pm$ 5%, 100 VDCW, 1/10 Watt.

Metal film: 12 ohms  $\pm$ 5%,100 VDCW, 1/10

1/10 Watt.

1/10 Watt.

1/10 Watt.

1/10 Watt.

1/10 Watt.

1/10 Watt.

Watt.

SYMBOL

R216

R217

R218

R219

R220

R224 R225

R226 R228

R229

R230

R231

R232

R233

R234

R235

R238

R240

R241

R242

R244

R245

R246

R247

R248

R249

R250

R251

R260

R270

R271

and R236

thru

SYMBOL	PART NO.	DESCRIPTION
R272		Metal film: 22K ohms ±5%, 100 VDCW,
R273		Metal film: 12K ohms ±5%, 100 VDCW, 1/10 Watt.
R274		Metal film: 390K ohms ±5%, 100 VDCW, 1/10 Watt.
R275		Metal film: 6.8K ohms ±5%, 100 VDCW, 1/10 Watt.
R276		Metal film: 2.2K ohms ±5%, 100 VDCW, 1/10 Watt.
R278		Metal film: 150 ohms ±5%, 100 VDCW, 1/10 Watt.
R279		Metal film: 5.6K ohms ±5%, 100 VDCW, 1/10 Watt.
R280		Metal film: 1.5K ohms ±5%, 100 VDCW, 1/10 Watt.
R281		Metal film: 150 ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.
R282		Metal film: 10K ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.
R283		Metal film: 56K ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.
R284		Metal film: 220 ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.
R285		Metal film: 270 ohms ±5%, 100 VDCW, 1/10 Watt.
R286		Metal film: 18 ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.
R287		Metal film: 270 ohms ±5%, 100 VDCW, 1/10 Watt.
R288 and R289		Metal film: 100 ohms ±5%, 50 VDCW, 1/16 Watt.
R294		Metal film: 10K ohms ±5%, 100 VDCW, 1/10 Watt.
R2001		Metal film: 27K ohms ±5%, 50 VDCW, 1/16 Watt.
R2005		Metal film: 3.3K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.
R2008		Metal film: 330 ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.
R2011		Metal film: 220K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.
R2012		Metal film: 100K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.
R2013		Metal film: 0 ohm.
R2303		Metal film: 4.7K ohms $\pm$ 5%, 100 VDCW. 1/10 Watt.
R2310		Metal film: 15K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.
R2313		Metal film: 39K ohms $\pm$ 5%, 50 VDCW, 1/16 Watt.
R2316		Metal film: 10K ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.
R2801		Metal film: 56 ohms $\pm$ 5%, 100 VDCW, 1/10 Watt.
RV201		Variable: 20K ohms $\pm 25\%$ , 1/10 Watt.
TP202		TERMINAL Test Terminal.

## PARTS LIST

TR201 and TR202Silicon, PNP: sim tTR203Silicon, NPN: sim tTR230Silicon, NPN: sim t XP1211.TR230Silicon, NPN: sim t 2SD596(DV3).TR241Silicon, NPN: sim t	SISTORS to NEC 2SB624(BV3). to PANASONIC
TR201 and TR202Silicon, PNP: sim t Silicon, NPN: sim t XP1211.TR230Silicon, NPN: sim t Silicon, NPN: sim t 2SD596(DV3).TR241Silicon, NPN: sim t 	to NEC 2SB624(BV3). to PANASONIC
and TR202Silicon, NPN: sim to XP1211.TR230Silicon, NPN: sim to 2SD596(DV3).TR241Silicon, NPN: sim to 	to PANASONIC
TR203Silicon, NPN: sim to XP1211.TR230Silicon, NPN: sim to 2SD596(DV3).TR241Silicon, NPN: sim to Silicon,	to PANASONIC
TR230Silicon, NPN: sim t 2SD596(DV3).TR241Silicon, NPN: sim t	
TR241 Silicon, NPN: sim t	to NEC
	to HITACHI 2SC4591.
TR242 Silicon, NPN: sim t	to NEC 2SC3356.
TR243 Silicon, NPN: sim t UN5216.	to PANASONIC
TR271 Silicon, NPN: sim t	to HITACHI 2SC4591.
TR272 Silicon, NPN: sim t	to NEC 2SC3356.
TR273 Silicon, NPN: sim t XP1216.	to PANASONIC
TR274 Silicon, NPN: sim t	to NEC 2SC3356.
TR2301 Silicon, NPN: sim t XP1216.	to PANASONIC
TR2304 Silicon, NPN: sim t	to PANASONIC
and UN5216. TR2305	
VI 201 Reference Occillat	YSTAL
±1.5 PPM.	
SYNTHESIZER/RECEIVER/EXCITI RECEIVER/EXCITER SECT CMN-359 Issue 2	er Board Ion
SYMBOL PART NO. DES	
CAF	ACITORS
C150 NOTE: Parts Ceramic: 8 pF coef 0±60 PPM	±5% 50 VDCW, temp 1.
C151 reference only. Refer to Service Ceramic: 6 pF temp coef 0±60	± 0.5 pF 50 VDCW, 0 PPM.
C152 Sections for serviceable Ceramic: 100 p	oF ±5% 50 VDCW, 0 PPM.
C153 parts. Ceramic: 470 p temp coef 0±60	0F ±5% 50 VDCW, 0 PPM.
C154 Ceramic: 1000 temp coef ± 15	pF ± 10% 50 VDCW, %.
C155 Ceramic: 100 p temp coef 0±60	0F ±5% 50 VDCW, 0 PPM.
C156 Ceramic: 100 p temp coef 0±60	0F ±5% 50 VDCW, 0 PPM.
	pF ± 10% 50 VDCW
C157 Ceramic: 1000 temp coef ± 15	i%.
C157         Ceramic: 1000 temp coef ± 15           C158         Ceramic: 10 pF temp coef 0±60	%. F ± 0.5 pF 50 VDCW, D PPM.

\*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	PART NO.	DESCRIPTION
C160		Ceramic: 22 pF ±5% 50 VDCW,
0404		temp coef 0±60 PPM.
0101		temp coef 0±60 PPM.
C162		Ceramic: 15 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C163		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C164 and		Ceramic: 1000 pF ±10% 50 VDCW,
C165		
C166		Tantalum: 22 uF + 20% 16 VDCW
C167		Ceramic: 100 pF $\pm$ 5% 50 VDCW,
C168		temp coef 0 $\pm$ 60 PPM. Ceramic: 2 pF $\pm$ 0.25 pF 50 VDCW,
C169		temp coet 0±250 PPM. Ceramic: 5 pE + 0.25 pE 50 VDCW.
0.00		temp coef $0\pm60$ PPM.
C401		temp coef $0\pm60$ PPM.
C402		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C403		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C404		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C405		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C406		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C407		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C408		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C410		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C411		Ceramic: 5 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0±60 PPM.
C412		Ceramic: 3 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0±120 PPM.
C420		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C422		Ceramic: 3 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 120 PPM.
C424		Ceramic: 3 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0±60 PPM.
C425		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C426		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C428		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C429		Ceramic: 100 pF $\pm$ 5% 50 VDCW, temp coef 0 $\pm$ 60 PPM.
C430		Ceramic: 0.01 $\mu F \pm$ 10% 50 VDCW, temp coef $\pm$ 15%.
C460		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.
C461		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM.

SYMBOL	PART NO.	DESCRIPTION		SYMBOL	P
C462		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.			
C463		Ceramic: 5 pF $\pm$ 0.5 pF 50 VDCW,		L150	
C464		Ceramic: 100 pF $\pm$ 5% 50 VDCW,		L401	
C465		temp coef 0±60 PPM.		L402	
0405		temp coef 0±60 PPM.		L460	
C466	Ceramic: 100 pF ±5% 50 VDC temp coef 0±60 PPM.			R150	
C467		Ceramic: 4 pF $\pm$ 0.25 pF 50 VDCW, temp coef 0 $\pm$ 60 PPM.		R151	
C468		Ceramic: 10 pF $\pm$ 0.5 pF 50 VDCW, temp coef 0 $\pm$ 60 PPM.		DAGO	
C469		Ceramic: 15 pF ±5% 50 VDCW, temp coef 0±60 PPM.		R152	
C471		Ceramic: 100 pF $\pm$ 5% 50 VDCW,		R153	
C472		Ceramic: 6 pF $\pm$ 0.5 pF 50 VDCW,		R154	
C473		Ceramic: 100 pF ±5% 50 VDCW,		R155	
C474		temp coef 0±60 PPM. Ceramic: 33 pF ±5% 50 VDCW,		R156	
C 475		temp coef $0\pm60$ PPM.		R157	
0475		temp coef 15%.		R158	
C476		Ceramic: 100 pF $\pm$ 5% 50 VDCW, temp coef 0 $\pm$ 60 PPM.		R159	
C477		Ceramic: 1000 pF $\pm$ 10% 50 VDCW, temp coef $\pm$ 15%.		P160	
C480		Ceramic: 0.1 $\mu$ F ± 10% 25 VDCW, temp coef ± 15%.		RIOU	
C481		Tantalum: 22 $\mu$ F $\pm$ 20% 16 VDCW.		R161	
C482		Ceramic: 0.1 $\mu$ F $\pm$ 10% 25 VDCW, temp coef $\pm$ 15%.		R162	
C483		Tantalum: 22 $\mu\text{F}$ $\pm$ 20% 16 VDCW.		R163	
		DIODES		R164	
CD150		Silicon: fast recovery (2 diodes in cathode). sim to TOSHIBA ISS184.		R165	
CD421		Silicon: fast recovery (2 diodes in cathode). sim to TOSHIBA ISS181.		R166	
		FILTER		D407	
FL151		RF B.P.F. Pass band 896 to 941 Mhz.		R167	
FL401		Dielectric RF Filter.		R168	
FL402		Dielectric RF Filter.		R169	
FL403		RF B.P.F. Pass band 768 to 788 MHz.: 2-POLE.		R401	
		INTEGRATED CIRCUITS		R402	
IC481		Linear: Positive Voltage Regulator; sim to NEC $\mu$ PC2409HF.		R403	
		JACKS		R404	
J151		Connector: RF.		R420	
J401		Connector: RF.		R421	
J501		Connector: 30 pins.		R422	
				117722	

# PARTS LIST

L	PART NO.	DESCRIPTION
		COILS
		Coil: RF 10 nh ± 10%.
		Coil: RF 10 nh $\pm$ 10%.
		Coll: RF.
		Coll: $RE 22 \text{ nh} \pm 10\%$
		RESISTORS
		VDCW, 1/10 Watt.
		Metal film: 470 ohms $\pm 5\%$ 50 VDCW, 1/16 Watt.
		Metal film: 12 ohms ±5% 50 VDCW, 1/16 Watt.
		Metal film: 470 ohms $\pm 5\%$ 50 VDCW, 1/16 Watt.
		Metal film: 2.2K ohms ±5% 50 VDCW, 1/16 Watt.
		Metal film: 2.2K ohms ±5% 50 VDCW, 1/16 Watt.
		Metal film: 220 ohms ±5% 50 VDCW, 1/16 Watt.
		Metal film: 3.3K ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
		Metal film: 100 ohms $\pm 5\%$ 50 VDCW, 1/16 Watt.
		Metal film: 220 ohms $\pm$ 5% 100 VDCW, 1/10 Watt.
		Metal film: 1K ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
		Metal film: 5.6K ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
		Metal film: 10 ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
		Metal film: 10 ohms ±5% 50 VDCW, 1/16 Watt.
		Metal film: 12 ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
		Metal film: 470 ohms $\pm 5\%$ 50 VDCW, 1/16 Watt.
		Metal film: 470 ohms ±5% 50 VDCW, 1/16 Watt.
		Metal film: 47 ohms $\pm 5\%$ 100 VDCW, 1/10 Watt.
		Metal film: 100 ohms ±5% 100 VDCW, 1/10 Watt.
		Metal film: 0 ohms.
		Metal film: 1.5K ohms ±5% 50 VDCW, 1/16 Watt.
		Metal film: 3.3K ohms ±5% 50 VDCW, 1/16 Watt.
		Metal film: 100 ohms ±5% 50 VDCW, 1/16 Watt.
		Metal film: 0 ohms.
		Metal film: 0 ohms.
		VDCW, 1/16 Watt.
		Metal film: 1.8K ohms ±5% 50 VDCW, 1/16 Watt.

SYMBOL	PART NO.	DESCRIPTION
R423		Metal film: 2.2K ohms ±5% 50 VDCW, 1/16 Watt
R424		Metal film: 2.2K ohms ±5% 50 VDCW, 1/16 Watt.
R425		Metal film: 100 ohms $\pm 5\%$ 50 VDCW, 1/16 Watt.
R427		Metal film: 100 ohms ±5% 100 VDCW, 1/10 Watt.
R428		Metal film: 100 ohms ±5% 50 VDCW, 1/16 Watt.
R429		Metal film: 68 ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
R430		Metal film: 100 ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
R460		Metal film: 180 ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
R461		Metal film: 27 ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
R462		Metal film: 180 ohms ±5% 50 VDCW, 1/16 Watt.
R463		Metal film: 2.2K ohms ±5% 50 VDCW, 1/16 Watt.
R464		Metal film: 2.2K ohms ±5% 50 VDCW, 1/16 Watt.
R465		Metal film: 100 ohms ±5% 50 VDCW, 1/16 Watt.
R466		Metal film: 220 ohms ±5% 50 VDCW, 1/16 Watt.
R467		Metal film: 1K ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
R468		Metal film: 5.6K ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
R469		Metal film: 10 ohms $\pm$ 5% 50 VDCW, 1/16 Watt.
R470		Metal film: 10 ohms ±5% 50 VDCW, 1/16 Watt.
R471		Metal film: 18 ohms ±5% 50 VDCW, 1/16 Watt.
R472		Metal film: 270 ohms ±5% 50 VDCW, 1/16 Watt.
R473		Metal film: 270 ohms ±5% 50 VDCW, 1/16 Watt.
R474		Metal film: 47 ohms ±5% 100 VDCW, 1/10 Watt.
R475		Metal film: 68 ohms ±5% 100 VDCW, 1/10 Watt.
		TRANSISTORS
TR151		Silicon, NPN; sim to NEC 2SC3356.
TR152		Silicon, PNP; sim to NEC 2SB624.
TR153		Silicon, NPN; sim to NEC 2SC3357.
1 K401 TP424		Silicon, NPN; SIM to NEC 2SC3356.
TR421		Silicon NPN sim to NEC 2905357.
TR461		Silicon, NPN: sim to NEC 28C3356
TR462		Silicon, NPN; sim to NEC 2SC3357.
		, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,

## OUTLINE DIAGRAM



COMPONENT SIDE

SOLDER SIDE

## LBI-39059A





ORION 900 MHz SYNTHESIZER/RECEIVER/EXCITER

#### SCHEMATIC DIAGRAM



## ORION 900 MHz SYNTHESIZER

(DD02-CMN-359)

## SCHEMATIC DIAGRAM



NOTE:

ALL RESISTOR ARE 1/16 WATT UNLESS OTHERWISE SPECIFIED. RESISTOR VALUES IN  $\Omega$  UNLESS FOLLOWED BY MULTIPLIER K. CAPACITOR VALUES IN F UNLESS FOLLOWED BY  $\_$  OR p. INDUCTANCE VALUES IN H UNLESS FOLLOWED BY  $\_$  OR n.

## LBI-39059A

## ORION 900 MHz RECEIVER/EXCITER

(DD00-CMN-359-1)