EV description

1. EV Specification / Tune Procedure

This specification contains only the information required for electronic adjustment of the POLARIS handset. The specification contains two sections; the adjustment procedure, and the adjustment range and configuration matrix.

Adjustment Procedure – Gives a detailed description of each adjustment of the handset in the required sequence.

Adjustment Range and Configuration Matrix – Gives the adjustment parameter, adjustment limits, and default EV value, and brief equipment set up for each adjustment.

1.1. Electronic Adjustment Support – Overview

POLARIS will support electronic adjustment of various audio and RF related parameters through an external test set by putting the radio into adjust mode. This document covers the adjustment procedure using the external test set. All adjustments are typically done using channel 350 in the cellular band or channel 1000 in the PCS band unless otherwise specified with the transceiver and audio control set as required for the adjustment. The POLARIS electronic adjustment allows for the setting of the following parameters:

- Battery Reference Voltage
- Charging
- AFC Tuning
- PA-GATE Bias Voltage
- Power Level
- Compressor Reference Level
- Standard Deviation
- Max Deviation
- SAT Deviation
- WBD / ST Deviation
- DTMF Deviation
- Expander Reference Level
- RX Audio Level
- Analog RSSI Calibration
- Digital RSSI Calibration
- PLL IC

1.2. Test Set Adjustment Operation

The test set originated adjustments generally operate as follows:

1. Commands are sent as 9600-baud asynchronous serial data with 8 data bits, non-parity and 1 stop bit. Commands are received on the RX data line and responses are sent on the TX data line. All commands are sent through the serial bus in the following format (in hex):
00 80 NN CC (D1) (D2) (D3) … (Dn)
Where NN is the number of bytes sent (command plus data), CC is the command op code, and D1 through Dn are data associated with the command (see individual command below for number of data bytes expected).
2. The adjust mode is entered by first sending the *Test Mode* and then sending the *Adjust Mode* command.
3. A set adjustment command (such as *Set SA*T) is sent to set up the hardware for the specified test with the current adjustment.

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4. The *Set Current Adjustment Value* command is issued along with a value which is used to set the selected adjustment and update the hardware. This may be repeated as necessary until the final adjustment value is determined.
5. The *Exit Adjustment Mode* command is issued to exit adjustment mode with the option to save all adjustments to nonvolatile memory. Handset returns to test mode.
6. The *Exit Active Adjustment Mode* command is issued to exit the current adjustment with the option to save to active memory. Handset is still in adjustment mode.
7. When all adjustments are complete, the *Normal Mode* command can be sent to return the unit to normal operation.
8. ALL RF POWERS LISTED ARE **NOT** CORRECTED FOR THE INTERNAL TRANSMISSION LINE PATH LOSS. ADD 1.2dB TO ALL RF POWERS IN THE CELLULAR BAND AND 2.2dB TO ALL RF POWERS IN THE PCS BAND TO COMPENSATE FOR THE INTERNAL TRANSMISSION LINE PATH LOSS.
9. Adjustments must be performed at +25 ±5 °C in the order specified. Adjustments performed outside the temperature range may produce erroneous results.

1.3. Enter Adjust Mode

Use this command to put the unit under test (UUT) into adjust mode. This must be done before issuing any other adjust commands.

1 Apply DC power (5.8+/-0.2[V]) to DC-PWR-IN at the I/O connector of the UUT.
2 Send Enter Test Mode command and then send Adjust Mode command.

1.4. Battery Reference Voltage Calibration

1 Set power supply as 3.6[V] to the battery terminal and turns on the handset.
2 Enter battery reference voltage calibration mode.
3 Set power supply as 4.2[V] to battery terminal.
4 Then save the ADC2 value.
5 Set power supply as 3.0[V] to battery terminal.
6 Then save the ADC2 value.
7 Exit battery reference voltage calibration mode.

1.5. Charging Calibration

1 Enter charging adjust mode.
2 Set external power supply as 5.8[V] to external power supply port (DC-PWR) battery terminal while the battery load is 84[ohm].
3 Adjust the battery terminal voltage as 4.2+/-0.02[V] with external power supply is open.
4 Then save the adjusted data.
5 Monitor current flow and save the value of it.
6 Set the battery current flow as 350[mA] with 12[ohm] load at battery terminal.
7 Save the value of current flow.
4 Exit charging adjust mode.

1.9. AFC Tuning

This procedure adjusts the TCXO output frequency by the transmission frequency of UUT at 380ch on AMPS mode.
1 Connect a frequency counter capable to the external antenna port.
2 Enter AFC adjustment mode
3 Measure the output frequency (Fhigh) with DAC value of 347[hex.] as D1 at Test Point (TP) 1402.
4 Measure the output frequency (Flow) with DAC value of 18C[hex.] as D2 at Test Point (TP) 1402.
5 Calculate the AFC slope (scale factor) as follows:

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7 AFC slope [Hz/Bit] = [delta f / delta DAC-value] at 800MHz
= (800[MHz]/19.44[MHz])*(Fhigh-Flow)*(D1-D2)
8 Calculate AFC Center value as follows:
9 AFC Center value = D2 + (D1-D2)*(19.44[MHz] - Flow)/(Fhigh-Flow)
10 Save adjusted data.
11 Exit AFC adjustment mode.

1.10. PA-GATE Bias Voltage Calibration

1 Enter PA-GATE adjustment mode
2 Measure the PA-GATE Bias Voltage at TP1201
3 Adjust this voltage as –2.5+/-0.03[V].
4 Save adjusted data.
5 Exit PA-GATE adjustment mode.

1.11. Power Level adjustment

The PA-GATE bias must be adjusted prior to this adjustment.

This procedure adjusts the UUT power output for PL2 through PL7 in the cellular band for AMPS mode, the UUT power output for PL2 through PL10 in the cellular band for TDMA mode, and the UUT power output for PL2 through PL10 in the PCS band for TDMA mode.

1 Connect a power meter capable of measuring CW and average burst power to the external antenna port.
2 Enter Power Level adjustment mode: Mode / Band, Channel, Power Level, Index.
3 Measure output power.
4 Adjust power per the following tables (powers listed do not include transmission line path loss).

AMPS Mode at Cellular Band

PL	Adjust to: [dBm]				
	Ch 991	Ch 160	Ch 380	Ch 580	Ch 799
2	25.0+/-0.5	25.0+/-0.5	25.0+/-0.5	25.0+/-0.5	25.0+/-0.5
3	23.8+/-0.5	23.8+/-0.5	23.8+/-0.5	23.8+/-0.5	23.8+/-0.5
4	NA	NA	19.8+/-0.5	NA	NA
5	NA	NA	15.8+/-0.5	NA	NA
6	NA	NA	11.8+/-0.5	NA	NA
7	NA	NA	7.8+/-0.5	NA	NA

TDMA Mode at Cellular Band

PL	Adjust to: [dBm]				
	Ch 991	Ch 160	Ch 380	Ch 580	Ch 799
2	26.8+/-0.5	26.8+/-0.5	26.8+/-0.5	26.8+/-0.5	26.8+/-0.5
3	23.8+/-0.5	23.8+/-0.5	23.8+/-0.5	23.8+/-0.5	23.8+/-0.5
4	NA	NA	19.8+/-0.5	NA	NA
5	NA	NA	15.8+/-0.5	NA	NA
6	NA	NA	11.8+/-0.5	NA	NA
7	NA	NA	7.8+/-0.5	NA	NA
8	NA	NA	1.8+/-0.5	NA	NA
9	NA	NA	-4.8+/-0.5	NA	NA
10	NA	NA	-9.8+/-0.5	NA	NA

TDMA Mode at PCS Band

PL	Adjust to: [dBm]				
	Ch 2	Ch 420	Ch 1000	Ch 1600	Ch 1998
2	26.0+/-0.5	26.0+/-0.5	26.0+/-0.5	26.0+/-0.5	26.0+/-0.5
3	23.8+/-0.5	23.8+/-0.5	23.8+/-0.5	23.8+/-0.5	23.8+/-0.5

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4	NA	NA	19.8+/-0.5	NA	NA
5	NA	NA	15.8+/-0.5	NA	NA
6	NA	NA	11.8+/-0.5	NA	NA
7	NA	NA	7.8+/-0.5	NA	NA
8	NA	NA	1.8+/-1.0	NA	NA
9	NA	NA	-4.8+/-0.5	NA	NA
10	NA	NA	-9.8+/-0.5	NA	NA

5 Send adjusted data.
6 Repeat above steps for all channels and power levels listed in the table above.
7 Exit power level adjustment mode.

1.12. Compressor reference Level Calibration

1 Connect a modulation analyzer to the external antenna port.
2 Apply –20.0[dBV], 1004Hz tone to TX audio at the I/O connector.
3 Enter compressor adjustment mode
4 Measure the FM deviation of the signal at the RF port of the I/O connector with a modulation analyzer.
5 Set the high pass filter to 300 Hz and the low pass filter to 3 kHz.
6 Send Compandor Off and then Compandor ON command.
7 Measure the difference in FM deviation between Compandor Off and Compandor On.
8 Adjust UMicGn in the CODEC to achieve a difference of less than 0.5[dB] of FM deviation.
9 Save adjusted data.
10 Exit compressor adjustment mode.

1.13. Standard Deviation

The Compressor Reference Level must be adjusted prior to this adjustment.

1 Connect a modulation analyzer to the external antenna port.
2 Apply –20.0[dBV], 1004[Hz] tone to TX audio at the I/O connector.
3 Enter standard deviation adjustment mode
4 Set the high pass filter to 300 Hz and the low pass filter to 3 kHz.
5 Measure the FM deviation of the signal at the RF port of the I/O connector with a modulation analyzer.
6 Adjust the TXMODGN to achieve 2.9+/-0.2[kHz] deviation.
7 Save adjusted data.
8 Exit standard deviation adjustment mode.

1.14. Max Deviation

The Compressor Reference Level must be adjusted prior to this adjustment.

1 Connect a modulation analyzer to the external antenna port.
2 Apply –20.0[dBV], 1004[Hz] tone to TX audio at the I/O connector.
3 Enter max deviation adjustment mode
4 Memorize the tone level.
5 Raise 20[dB] from the tone level above.
6 Set the high pass filter to 300 Hz and the low pass filter to 3 kHz.
7 Adjust TxAudLimThr to achieve the FM deviation as +/-12[kHz].
8 Save adjusted data.
9 Exit max deviation adjustment mode.

1.15. SAT Deviation

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This adjustment sets the deviation of transmitted SAT. The Compressor Reference Level and
Standard Deviation must be adjusted prior to this adjustment.

1. Connect a modulation analyzer to the external antenna port.
2. Enter SAT Deviation adjustment mode
3. Measure the FM deviation of the signal at the external antenna connector with a modulation analyzer.
4. Set the high pass filter to 300 Hz and the low pass filter to 15 kHz.
5. Adjust SAT deviation as a deviation of 2.0 ±0.2 kHz.
6. Save the adjusted data
7. Exit SAT Deviation adjustment mode

1.16. WBD/ST Deviation

This adjustment sets the deviation of transmitted WBD/ST. The Compressor Reference Level and Standard Deviation must be adjusted prior to this adjustment.

1. Connect a modulation analyzer to the external antenna port.
2. Enter SAT/ST Deviation adjustment mode
3. Measure the FM deviation of the signal at the external antenna connector with a modulation analyzer.
4. Set the high pass filter to 300 Hz and the low pass filter to 15 kHz.
5. Adjust SAT/ST deviation as a deviation of 8.0 ±0.8 kHz.
6. Save the adjusted data
7. Exit SAT/ST Deviation adjustment mode

1.17. DTMF Deviation

This adjustment sets the deviation of transmitted DTMF. The Compressor Reference Level and Standard Deviation must be adjusted prior to this adjustment.

1. Connect a modulation analyzer to the external antenna port.
2. Enter DTMF Deviation adjustment mode
3. Measure the PM deviation of the signal at the external antenna connector with a modulation analyzer.
4. Set the high pass filter to 300 Hz and the low pass filter to 15 kHz.
5. Adjust DTMF-Low deviation as a deviation of 4.5+/-1.5(rad.) at 941MHz.
6. Adjust DTMF-High deviation as a deviation of 4.5+/-1.5(rad.) at1633MHz.
6. Save the adjusted data
7. Exit DTMF Deviation adjustment mode

1.18. Expander Reference Level calibration

1 Apply -50[dBm], 1004Hz tone @ 2.9[kHz] FM deviation RF signal on 380ch to the external antenna port.
2 Enter expander adjustment mode
3 Measure the AC voltage of the RX audio signal(1004Hz) at external I/O port with a high impedance voltmeter.
4 Send the Compandor Off and Compandor On command.
5 Measure the difference in audio level between Compandor Off and Compandor On.
6 Adjust RxModgain to achieve a difference of less than 0.5[Vpp] of AC voltage.
7 Save adjusted data.
8 Exit expander adjustment mode.

1.19. RX Audio Level Calibration

1 Apply**??** [dBm], 1000Hz tone @ 2.9[kHz] FM deviation RF signal on 380ch to the external antenna port.

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2 Enter RX Audio Level adjustment mode.
3 Measure the audio level at the RX audio on I/O connector with a high impedance voltmeter.
4 Adjust UspkrGn for an AC voltage of –18.2+/-0.5[dBV].
5 Save adjusted data.
6 Exit compressor adjustment mode.

1.20. Analog RSSI Calibration

This procedure calibrates RSSI to standard RF levels in the cellular and PCS bands. All applied RF levels listed in this calibration do not include correction for path loss in the I/O RF port.

1 Enter Analog RSSI Adjustment mode.
2 Apply a pai/4 shifted DQPSK signal, data = PN9, into the external antenna port for each of the following RF levels.

Cellular Band

RF Level: [dBm]				
991ch	160ch	380ch	580ch	799ch
NA	NA	-40	NA	NA
NA	NA	-65	NA	NA
-80	-80	-80	-80	-80
NA	NA	-100	NA	NA
NA	NA	-110	NA	NA

PCS Band

RF Level: [dBm]				
2ch	420ch	1000ch	1600ch	1998ch
NA	NA	-40	NA	NA
NA	NA	-65	NA	NA
-80	-80	-80	-80	-80
NA	NA	-100	NA	NA
NA	NA	-110	NA	NA

3 Save calibrated data
4 Exit analog RSSI adjustment mode.

1.21. Digital RSSI calibration

This procedure calibrates RSSI to standard RF levels in the cellular band. All applied RF levels listed in this calibration do not include correction for path loss in the I/O RF port.

1 Enter Digital RSSI Adjustment mode.
2 Apply a –100[dBm] pai/4 shifted DQPSK signal, data = PN9, on 380ch into the external antenna port.
3 Send RSSI REQUEST: V1 [V]
4 Apply a -50[dBm] pai/4 shifted DQPSK signal, data = PN9, on 383ch into the external antenna port.
5 Send RSSI REQUEST: V2 [V]
6 Calculate RSSI Slope and RSSI OFFSET as follows
RSSI SLOPE [V/dBm] = (V2-V1)/(-50- (-100))
RSSI OFFSET [V] = V1

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7 Save the data above.
8 Apply a –70[dBm] pai/4 shifted DQPSK signal, data = PN9, on following channel into the external antenna port.

Cellular Band

991ch	160ch	580ch	799ch

PCS Band

2ch	420ch	1600ch	1998ch

9 Save adjusted data.
10 Repeat 8 through 9 changing the channel.
10 Exit Digital RSSI adjustment mode.

1.22. PLL IC calibration

This procedure calibrates the charge pump current that causes the spurious on transmission frequency.

1 Connect a spectrum analyzer capable of measuring spurious to the external antenna port.
2 Enter PLL IC adjustment mode. (TX data: all '0' and continuous transmission)
3 Measure the spurious level.
4 Adjust the PLL-DAC to achieve the spurious level as -70[dBc] from the carrier level following the table below.

Cellular Band

Channel				
991ch	160ch	380ch	580ch	799ch

PCS Band

Channel				
2ch	420ch	1000ch	1600ch	1998ch

5 Send adjusted data.
6 Repeat above steps for all channels and power levels listed in the table above.
7 Exit PLL IC adjustment mode.

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PARTS LIST

REF. No.	Comp. Number	Value
C 1101	CC1005	0pF
C 1102	ECUE1H100DCQ	10pF
C 1103	ECUE1H330JCQ	33pF
C 1104	GRM36CK0R5B50-641/PT281	0.5pF
C 1105	GRM36CH101J50S641/PT281	100pF
C 1107	GRM36CJ030B50-641/PT281	3pF
C 1108	GRM36CH101J50S641/PT281	100pF
C 1109	GRM36CH101J50S641/PT281	100pF
C 1110	GRM36CH101J50S641/PT281	100pF
C 1111	GRM36CK010B50-641/PT281	1pF
C 1112	GRM36CK1R5C50-641/PT281	1.5pF
C 1202	GRM36CK1R5C50-641/PT281	1.5pF
C 1203	ECUE1H330JCQ	33pF
C 1204	GRM36CH101J50S641/PT281	100pF
C 1206	C1005JB1C333KT900F	0.033uF
C 1207	ECUE1H470JCQ	47pF
C 1208	ECUE1H220JCQ	22pF
C 1209	ECUE1H220JCQ	22pF
C 1210	ECUE1H220JCQ	22pF
C 1211	GRM36CH101J50S641/PT281	100pF
C 1212	JMK107BJ105KA-T	1uF
C 1213	GRM36CH101J50S641/PT281	100pF
C 1214	GRM36CH101J50S641/PT281	100pF
C 1215	GRM36CH101J50S641/PT281	100pF
C 1216	JMK107BJ105KA-T	1uF
C 1217	CC1608	0pF
C 1218	CC1608	0pF
C 1221	GRM36CJ030B50-641/PT281	3pF
C 1223	ECUE1H220JCQ	22pF
C 1224	CC1005	0pF
C 1225	GRM36CH101J50S641/PT281	100pF
C 1229	C1005JB0J104KT000F	0.1uF
C 1235	GRM36B103K16D641/PT281	0.01uF
C 1236	JMK107BJ105KA-T	1uF
C 1237	JMK107BJ105KA-T	1uF
C 1238	ECST0JZ475R	4.7uF
C 1239	CC1005	0pF

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C 1240	JMK107BJ105KA-T	1uF
C 1241	JMK107BJ105KA-T	1uF
C 1301	GRM36CKR75B50-641/PT281	0.75pF
C 1302	ECUE1H220JCQ	22pF
C 1303	ECUE1H220JCQ	22pF
C 1304	ECUE1H102KBQ	0.001uF
C 1305	CC1005	0pF
C 1306	ECUE1H220JCQ	22pF
C 1307	ECUE1H331KBQ	330pF
C 1308	GRM36CK020B50-641/PT281	2pF
C 1309	GRM36CH060C50-641/PT281	6pF
C 1310	CC1005	0pF
C 1311	CC1005	0pF
C 1312	GRM36CH040C50-641/PT281	4pF
C 1314	GRM36CH101J50S641/PT281	100pF
C 1315	ECST0JZ106R	10uF
C 1316	ECUE1H220JCQ	22pF
C 1317	ECUE1H220JCQ	22pF
C 1318	GRM36B103K16D641/PT281	0.01uF
C 1319	GRM36CH101J50S641/PT281	100pF
C 1321	ECUE1H220JCQ	22pF
C 1325	GRM36B562K25-641/PT281	0.0056uF
C 1326	ECUE1H220JCQ	22pF
C 1327	GRM36CH101J50S641/PT281	100pF
C 1328	ECUE1H220JCQ	22pF
C 1329	GRM36CK1R5C50-641/PT281	1.5pF
C 1330	ECUE1H820JCQ	82pF
C 1331	GRM40B105K10U550/PT105	1uF
C 1332	GRM40B122K50C500/PT105	0.0012uF
C 1333	ECUE1H270JCQ	27pF
C 1334	ECUE1H220JCQ	22pF
C 1335	ECUE1H220JCQ	22pF
C 1336	ECUE1H220JCQ	22pF
C 1337	GRM36CK1R5C50-641/PT281	1.5pF
C 1338	GRM36CH101J50S641/PT281	100pF
C 1339	GRM36B103K16D641/PT281	0.01uF
C 1340	TESVSP1C105M8R	1uF
C 1341	GRM36CH101J50S641/PT281	100pF
C 1342	GRM36CH090C50-641/PT281	9pF
C 1343	ECUE1H102KBQ	0.001uF

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C 1344	GRM36CH150J50-641/PT281	15pF
C 1345	ECUE1H102KBQ	0.001uF
C 1346	ECUE1H220JCQ	22pF
C 1347	GRM36CJ030B50-641/PT281	3pF
C 1348	ECUE1H180JCQ	18pF
C 1349	ECUE1H180JCQ	18pF
C 1350	ECUE1H220JCQ	22pF
C 1351	ECUE1H102KBQ	0.001uF
C 1352	ECUE1H102KBQ	0.001uF
C 1353	ECUE1H270JCQ	27pF
C 1354	GRM36CH060C50-641/PT281	6pF
C 1401	C1005JB0J104KT000F	0.1uF
C 1402	C1005JB0J104KT000F	0.1uF
C 1403	C1005JB1A473KT900F	0.047uF
C 1404	GRM36B103K16D641/PT281	0.01uF
C 1405	ECUE1H102KBQ	0.001uF
C 1406	CC1005	0pF
C 1407	GRM36CJ030B50-641/PT281	3pF
C 1408	GRM36CK020B50-641/PT281	2pF
C 1409	ECUE1H470JCQ	47pF
C 1410	ECUE1H102KBQ	0.001uF
C 1411	C1005JB0J104KT000F	0.1uF
C 1412	ECUE1H102KBQ	0.001uF
C 1413	CC1005	0pF
C 1414	ECUE1H220JCQ	22pF
C 1415	ECUE1H220JCQ	22pF
C 1416	ECUE1H470JCQ	47pF
C 1417	ECUE1H102KBQ	0.001uF
C 1418	ECUE1H102KBQ	0.001uF
C 1419	CC1005	0pF
C 1420	CC1005	0pF
C 1421	GRM40B562K50C500/PT105	0.0056uF
C 1422	GRM36B272K50-641/PT281	0.0027uF
C 1423	GRM36CK020B50-641/PT281	2pF
C 1424	GRM36CK020B50-641/PT281	2pF
C 1426	ECUE1H102KBQ	0.001uF
C 1427	GRM36CH101J50S641/PT281	100pF
C 1428	ECUE1H100DCQ	10pF
C 1429	GRM36CH101J50S641/PT281	100pF
C 1430	ECUE1H102KBQ	0.001uF

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C 1431	ECUE1H102KBQ	0.001uF
C 1432	C1005JB0J104KT000F	0.1uF
C 1433	GRM36B103K16D641/PT281	0.01uF
C 1434	ECUE1H102KBQ	0.001uF
C 1436	ECUE1H102KBQ	0.001uF
C 1437	GRM36CK1R5C50-641/PT281	1.5pF
C 1438	ECUE1H220JCQ	22pF
C 1440	ECUE1H102KBQ	0.001uF
C 1441	CC1005	0pF
C 1442	CC1005	0pF
C 1501	ECUE1H102KBQ	0.001uF
C 1502	C1005JB0J104KT000F	0.1uF
C 1503	ECUE1H102KBQ	0.001uF
C 1504	C1005JB0J104KT000F	0.1uF
C 1505	ECUE1H470JCQ	47pF
C 1506	ECUE1H102KBQ	0.001uF
C 1507	ECUE1H152KBQ	0.0015uF
C 1508	ECUE1H102KBQ	0.001uF
C 1509	ECUE1H102KBQ	0.001uF
C 1510	GRM36B153K16D641/PT281	0.015uF
C 1511	GRM36B562K25-641/PT281	0.0056uF
C 1512	GRM36B153K16D641/PT281	0.015uF
C 1513	GRM36B562K25-641/PT281	0.0056uF
C 1514	C1005JB0J104KT000F	0.1uF
C 1517	CC1005	0pF
C 1601	ECUE1H100DCQ	10pF
C 1602	ECUE1H102KBQ	0.001uF
C 1603	GRM36B103K16D641/PT281	0.01uF
C 1604	GRM36CH101J50S641/PT281	100pF
C 1605	GRM36CH090C50-641/PT281	9pF
C 1607	GRM36B103K16D641/PT281	0.01uF
C 1609	CC1005	0pF
C 1614	CC1005	0pF
C 1615	GRM36CH060C50-641/PT281	6pF
C 1616	GRM36CH090C50-641/PT281	9pF
C 1617	CC1005	0pF
C 1618	GRM36CH070C50-641/PT281	7pF
C 1619	ECUE1H102KBQ	0.001uF
C 1620	C1005JB0J104KT000F	0.1uF
C 1623	C1005JB0J104KT000F	0.1uF

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C 1624	ECUE1H100DCQ	10pF
C 1625	ECUE1H271KBQ	270pF
C 1626	GRM40CH182J50S500/PT288	0.0018uF
C 1627	ECUE1H102KBQ	0.001uF
C 1628	GRM36B103K16D641/PT281	0.01uF
C 1629	CC1005	0pF
C 1630	GRM36CH101J50S641/PT281	100pF
C 1631	GRM36CH101J50S641/PT281	100pF
C 1632	GRM36CH101J50S641/PT281	100pF
C 1633	ECUE1H102KBQ	0.001uF
C 1635	GRM36B562K25-641/PT281	0.0056uF
C 1636	GRM36B562K25-641/PT281	0.0056uF
C 1637	ECUE1H390JCQ	39pF
C 1638	ECUE1H390JCQ	39pF
C 1639	ECUE1H102KBQ	0.001uF
C 1640	ECUE1H102KBQ	0.001uF
C 1641	GRM36B562K25-641/PT281	0.0056uF
C 1642	GRM36B562K25-641/PT281	0.0056uF
C 1643	ECUE1H820JCQ	82pF
C 1644	GRM36CK010B50-641/PT281	1pF
C 1645	GRM36CH040C50-641/PT281	4pF
C 1646	GRM36CH060C50-641/PT281	6pF
C 1647	GRM36CH060C50-641/PT281	6pF
C 1648	CC1005	0pF
C 1701	GRM39B103K50C500/PT264	0.01uF
C 1702	GRM36B103K16D641/PT281	0.01uF
C 1703	GRM40B105K10U550/PT105	1uF
C 2101	GRM36B103K16D641/PT281	0.01uF
C 2102	GRM36B103K16D641/PT281	0.01uF
C 2103	GRM36B103K16D641/PT281	0.01uF
C 2104	GRM36B103K16D641/PT281	0.01uF
C 2105	GRM36B103K16D641/PT281	0.01uF
C 2106	GRM36B103K16D641/PT281	0.01uF
C 2107	GRM36B103K16D641/PT281	0.01uF
C 2108	GRM36B103K16D641/PT281	0.01uF
C 2109	GRM36B103K16D641/PT281	0.01uF
C 2110	GRM36B103K16D641/PT281	0.01uF
C 2111	GRM36B103K16D641/PT281	0.01uF
C 2112	GRM36B103K16D641/PT281	0.01uF
C 2113	GRM36B103K16D641/PT281	0.01uF

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C 2114	GRM36B103K16D641/PT281	0.01uF
C 2115	GRM36B103K16D641/PT281	0.01uF
C 2120	C1005JB1A473KT900F	0.047uF
C 2121	GRM36CH060C50-641/PT281	6pF
C 2122	GRM36CH060C50-641/PT281	6pF
C 2127	JMK107BJ105KA-T	1uF
C 2129	JMK107BJ105KA-T	1uF
C 2201	C1005JB0J104KT000F	0.1uF
C 2202	C1005JB0J104KT000F	0.1uF
C 2301	GRM36B103K16D641/PT281	0.01uF
C 2302	ECST0JZ475R	4.7uF
C 2303	GRM36B103K16D641/PT281	0.01uF
C 2304	ECST0JZ475R	4.7uF
C 2305	GRM36B103K16D641/PT281	0.01uF
C 2306	ECST0JZ475R	4.7uF
C 2307	GRM36B103K16D641/PT281	0.01uF
C 2308	ECST0JZ475R	4.7uF
C 2309	GRM36B103K16D641/PT281	0.01uF
C 2310	ECST0JZ475R	4.7uF
C 2311	GRM36B103K16D641/PT281	0.01uF
C 2312	ECST0JZ475R	4.7uF
C 2313	GRM36B103K16D641/PT281	0.01uF
C 2314	ECST0JZ475R	4.7uF
C 2315	GRM36B103K16D641/PT281	0.01uF
C 2316	ECST0JZ475R	4.7uF
C 2318	C1005JB0J104KT000F	0.1uF
C 2319	GRM36B103K16D641/PT281	0.01uF
C 2320	C1005JB0J104KT000F	0.1uF
C 2321	C1005JB0J104KT000F	0.1uF
C 2323	C1005JB1A473KT900F	0.047uF
C 2324	ECUE1H102KBQ	0.001uF
C 2325	ECUE1H102KBQ	0.001uF
C 2326	C1005JB0J104KT000F	0.1uF
C 2327	C1608JB1A474VT900N	0.47uF
C 2328	C1608JB1A474VT900N	0.47uF
C 2329	ECUE1H821KBQ	820pF
C 2330	C1005JB0J104KT000F	0.1uF
C 2331	C1005JB0J104KT000F	0.1uF
C 2332	ECST0JZ106R	10uF
C 2333	ECST0JZ106R	10uF

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C 2334	ECUE1H122KBQ	0.0012uF
C 2335	C1005JB1C223KT000F	0.022uF
C 2336	ECUE1H471KBQ	470pF
C 2337	GRM39B224K10U530/PT264	0.22uF
C 2338	JMK107BJ105KA-T	1uF
C 2340	ECUE1H220JCQ	22pF
C 2341	CC1005	0pF
C 2342	JMK107BJ105KA-T	1uF
C 2343	ECST0JZ106R	10uF
C 2345	ECUE1H152KBQ	0.0015uF
C 2346	ECST0JZ106R	10uF
C 2348	C1005JB0J104KT000F	0.1uF
C 2349	ECUE1H102KBQ	0.001uF
C 2352	CC1005	0pF
C 2353	CC1005	0pF
C 2354	C1005JB1A473KT900F	0.047uF
C 2355	LMK105BJ104KV-F	0.1uF
C 2356	ECUE1H102KBQ	0.001uF
C 2357	LMK105BJ104KV-F	0.1uF
C 2358	ECST0JZ225R	2.2uF
C 2360	C1005JB0J104KT000F	0.1uF
C 2361	C1005JB0J104KT000F	0.1uF
C 2362	JMK107BJ105KA-T	1uF
C 2363	ECUE1H331KBQ	330pF
C 2364	ECUE1H821KBQ	820pF
C 2365	GRM40B105K10U550/PT105	1uF
C 2366	C1005JB0J104KT000F	0.1uF
C 2367	CC1005	0pF
C 2368	GRM40B105K10U550/PT105	1uF
C 2369	CC1608	0pF
C 2370	ECST0JZ106R	10uF
CN1101	PY76011A	---
CN1701	0-0353832-1	---
CN2001	JA76020A	---
CN2002	PY76024A	---
D 1201	IMN10T108	---
D 1301	MA2S376	---
D 1302	MA2S376	---
D 1303	HVC133TRF	---
D 1601	MA2S376	---

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D 1702	MAZ80680ML	---
D 1703	MAZ80680ML	---
D 1704	MAZ80680ML	---
D 2301	MAZ80680ML	---
D 2302	MA2SD1000L	---
D 2303	RB491DT146	---
D 2306	MA2S11100L	---
D 2308	MAZ80680ML	---
D 2309	RB491DT146	---
D 2310	MA2SD1000L	---
D 2311	MA2S11100L	---
D 2501	HZM6.8FATR	---
D 2502	HZM6.8FATR	---
D 2505	MA2S11100L	---
D 2506	MA2S11100L	---
E 1301	EY76041A	---
E 1302	EY76040A	---
E 1401	EY76038A	---
E 1402	EY76039A	---
E 1703	JJ76002A	---
E 1704	JJ76002A	---
F 2301	FG76001A	---
FL1101	FL76110A	---
FL1102	FY76030A	---
FL1201	FY76032A	---
FL1202	FY76026A	---
FL1602	FY76037A	---
FL1603	FL76110A	---
FL1604	FS76014A	---
L 1101	HK100512NJ-T	12nH
L 1102	HK10052N7S-T	2.7nH
L 1103	ELJRE3N9JF2	3.9nH
L 1104	ELJRE1N8ZF2	1.8nH
L 1105	ELJRF6N8JF2	6.8nH
L 1106	HK10052N2S-T	2.2nH
L 1201	ELJRER15JF3	150nH
L 1208	LB2012T101M	100uH
L 1209	HK10054N7S-T	4.7nH
L 1210	HK10055N6S-T	5.6nH
L 1301	HK10055N6S-T	5.6nH

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L 1302	ELJRF6N8JF2	6.8nH
L 1303	ELJRF6N8JF2	6.8nH
L 1305	ELJRF15NJF2	15nH
L 1306	HK100518NJ-T	18nH
L 1307	ELJRF82NJF2	82nH
L 1308	ELJRF15NJF2	15nH
L 1309	HK100518NJ-T	18nH
L 1310	ELJRE3N9JF2	3.9nH
L 1311	HK100510NJ-T	10nH
L 1312	ELJRE3N9JF2	3.9nH
L 1314	ELJRER12JF3	120nH
L 1315	HK10053N3S-T	3.3nH
L 1316	LH1005	∞
L 1401	ELJRE8N2JF2	8.2nH
L 1402	ELJRF2N2DF2	2.2nH
L 1407	HK10058N2J-T	8.2nH
L 1408	HK10053N3S-T	3.3nH
L 1601	ELJRE10NJF2	10nH
L 1602	ELJRER15JF3	150nH
L 1603	HK100510NJ-T	10nH
L 1604	ELJRER15JF3	150nH
L 1605	HK10053N9S-T	3.9nH
L 1606	HK10051N2S-T	1.2nH
L 1609	LQW1608A39NG00T1M00-140	39nH
L 1610	ELJRER22JF3	220nH
L 1612	ELJRER15JF3	150nH
L 1613	HK100510NJ-T	10nH
L 1615	HK10052N7S-T	2.7nH
LS1701	HB76004B	---
Q 1202	UPA1912TE-T1	---
Q 1203	XP0121300L	47kohm
Q 1204	UPA1912TE-T1	---
Q 1206	UPA1912TE-T1	---
Q 1301	UNR9213J0L	47kohm
Q 1303	UPA801T	---
Q 1304	UNR9213J0L	47kohm
Q 1401	XP0111300L	47kohm
Q 1402	XP0111300L	47kohm
Q 1403	BFP540GEG	---
Q 1601	FDC6304P	---

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Q 2301	UPA1912TE-T1	---
Q 2303	UPA1912TE-T1	---
Q 2304	UPA1912TE-T1	---
Q 2501	UPA1912TE-T1	---
R 1101	ERJ2GEJ102X	1kohm
R 1102	ERJ2GEJ102X	1kohm
R 1103	ERJ2GEJ102X	1kohm
R 1104	RY1005	∞
R 1105	ERJ2GE0R00XH	0ohm
R 1106	ERJ2GE0R00XH	0ohm
R 1201	ERJ2GEJ273X	27kohm
R 1203	ERJ3GEY0R00V	0ohm
R 1204	ERJ3GEY0R00V	0ohm
R 1205	ERJ3GEY0R00V	0ohm
R 1206	ERJ3GEY0R00V	0ohm
R 1208	ERJ2GEJ102X	1kohm
R 1213	ERJ2GEJ102X	1kohm
R 1214	ERJ2GEJ223X	22kohm
R 1219	ERJ2GEJ104X	100kohm
R 1220	ERJ2GEJ104X	100kohm
R 1221	ERJ2GEJ104X	100kohm
R 1222	RY1005	∞
R 1223	ERJ2GE0R00XH	0ohm
R 1224	RY1005	∞
R 1225	RY1005	∞
R 1226	ERJ2GE0R00XH	0ohm
R 1227	RY1005	∞
R 1228	RY1005	∞
R 1301	ERJ2GEJ182X	1.8kohm
R 1304	ERJ2GEJ103X	10kohm
R 1305	ERJ2GEJ332X	3.3kohm
R 1306	ERJ2GEJ273X	27kohm
R 1309	ERJ2GEJ121X	120ohm
R 1310	ERJ2GEJ470X	47ohm
R 1312	ERJ2GEJ104X	100kohm
R 1313	ERJ2GEJ122X	1.2kohm
R 1314	ERJ2GEJ104X	100kohm
R 1319	ERJ2GEJ221X	220ohm
R 1320	ERJ2GEJ102X	1kohm
R 1321	ERJ2GEJ222X	2.2kohm

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R 1322	ERJ2GEJ222X	2.2kohm
R 1323	ERJ2GEJ101X	100ohm
R 1324	ERJ2GEJ560X	56ohm
R 1325	ERJ2GEJ822X	8.2kohm
R 1326	ERJ2GEJ392X	3.9kohm
R 1327	ERJ2GEJ392X	3.9kohm
R 1328	ERJ2GEJ393X	39kohm
R 1329	ERJ2GEJ472X	4.7kohm
R 1332	RY1005	∞
R 1333	ERJ2GEJ332X	3.3kohm
R 1334	ERJ2GEJ332X	3.3kohm
R 1335	RY1005	∞
R 1336	ERJ2GEJ332X	3.3kohm
R 1337	ERJ2GEJ332X	3.3kohm
R 1338	ERJ2GEJ470X	47ohm
R 1339	ERJ2GEJ121X	120ohm
R 1342	ERJ2GE0R00XH	0ohm
R 1343	ERJ2GEJ183X	18kohm
R 1401	ERJ2GEJ822X	8.2kohm
R 1402	ERJ2GEJ101X	100ohm
R 1403	ERJ2GEJ101X	100ohm
R 1404	RY1005	∞
R 1405	ERJ2GEJ183X	18kohm
R 1406	RY1005	∞
R 1407	ERJ2GE0R00XH	0ohm
R 1408	ERJ2GE0R00XH	0ohm
R 1409	RY1005	∞
R 1410	ERJ2GEJ271X	270ohm
R 1411	ERJ2GEJ561X	560ohm
R 1412	ERJ2GE0R00XH	0ohm
R 1413	ERJ2GE0R00XH	0ohm
R 1414	ERJ2GEJ103X	10kohm
R 1415	ERJ2GE0R00XH	0ohm
R 1416	ERJ2GEJ104X	100kohm
R 1417	ERJ2GEJ104X	100kohm
R 1419	ERJ2GEJ561X	560ohm
R 1420	ERJ2GEJ470X	47ohm
R 1423	ERJ2GEJ332X	3.3kohm
R 1427	ERJ2GEJ102X	1kohm
R 1428	ERJ2GEJ102X	1kohm

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R 1429	ERJ2GEJ102X	1kohm
R 1430	ERJ2GE0R00XH	0ohm
R 1431	ERJ3GEY0R00V	0ohm
R 1501	ERJ2GEJ102X	1kohm
R 1502	ERJ2GEJ104X	100kohm
R 1503	ERJ2GEJ100X	10ohm
R 1504	ERJ2GEJ104X	100kohm
R 1505	ERJ2GEJ273X	27kohm
R 1506	ERJ2GEJ102X	1kohm
R 1507	ERJ2GEJ273X	27kohm
R 1508	ERJ2GEJ273X	27kohm
R 1509	ERJ2GEJ562X	5.6kohm
R 1510	ERJ2GE0R00XH	0ohm
R 1511	ERJ2GEJ821X	820ohm
R 1512	ERJ2GEJ821X	820ohm
R 1513	ERJ2GEJ821X	820ohm
R 1514	ERJ2GEJ821X	820ohm
R 1515	ERJ2GEJ470X	47ohm
R 1516	ERJ2GEJ104X	100kohm
R 1517	ERJ2GEJ683X	68kohm
R 1601	ERJ2GEJ100X	10ohm
R 1602	ERJ2GEJ100X	10ohm
R 1603	ERJ2GEJ100X	10ohm
R 1604	ERJ2GEJ100X	10ohm
R 1605	ERJ2GEJ103X	10kohm
R 1606	ERJ2GEJ103X	10kohm
R 1607	ERJ2GEJ100X	10ohm
R 1608	ERJ2GEJ103X	10kohm
R 1609	ERJ2GEJ331X	330ohm
R 1610	ERJ2GEJ561X	560ohm
R 1613	ERJ2GEJ103X	10kohm
R 1614	ERJ2GEJ103X	10kohm
R 1616	ERJ2GEJ104X	100kohm
R 1617	ERJ2GEJ681X	680ohm
R 1618	RY1005	∞
R 1619	ERJ3GEYJ000V	0ohm
R 1701	ERJ3GEYJ101X	100ohm
R 2101	RY1005	∞
R 2102	ERJ2GEJ103X	10kohm
R 2103	RY1005	∞

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R 2104	RY1005	∞
R 2105	RY1005	∞
R 2107	ERJ2GEJ104X	100kohm
R 2108	ERJ2GEJ104X	100kohm
R 2112	ERJ2GEJ222X	2.2kohm
R 2120	ERJ2GEJ102X	1kohm
R 2121	ERJ2GEJ102X	1kohm
R 2124	ERJ2GE0R00XH	0ohm
R 2125	ERJ2GE0R00XH	0ohm
R 2126	ERJ2GE0R00XH	0ohm
R 2127	ERJ2GE0R00XH	0ohm
R 2128	ERJ2GE0R00XH	0ohm
R 2129	ERJ2GE0R00XH	0ohm
R 2130	ERJ2GE0R00XH	0ohm
R 2131	ERJ2GE0R00XH	0ohm
R 2132	ERJ2GE0R00XH	0ohm
R 2133	ERJ2GE0R00XH	0ohm
R 2134	ERJ2GE0R00XH	0ohm
R 2141	ERJ2GEJ330X	33ohm
R 2142	ERJ2GEJ104X	100kohm
R 2143	ERJ2GEJ104X	100kohm
R 2144	ERJ2GEJ104X	100kohm
R 2145	ERJ2GEJ104X	100kohm
R 2146	ERJ2GEJ104X	100kohm
R 2148	ERJ2GEJ104X	100kohm
R 2201	RY1005	∞
R 2202	ERJ2GE0R00XH	0ohm
R 2203	ERJ2GE0R00XH	0ohm
R 2204	RY1005	∞
R 2205	ERJ2GEJ103X	10kohm
R 2301	ERJ2GEJ220X	22ohm
R 2302	ERJ2GEJ104X	100kohm
R 2307	RY1005	∞
R 2308	ERJ2GEJ154X	150kohm
R 2309	ERJ2GEJ104X	100kohm
R 2310	ERJ2GEJ274X	270kohm
R 2311	ERJ6RSFR15V	0.15ohm
R 2312	ERJ2GEJ274X	270kohm
R 2313	RY1005	∞
R 2314	ERJ2GEJ104X	100kohm

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R 2315	ERJ2GEJ473X	47kohm
R 2316	ERJ2GEJ123X	12kohm
R 2317	ERJ2GEJ123X	12kohm
R 2318	ERJ2GEJ473X	47kohm
R 2320	ERJ2GEJ333X	33kohm
R 2321	ERJ2GEJ332X	3.3kohm
R 2322	ERJ2GEJ823X	82kohm
R 2323	ERJ2GEJ472X	4.7kohm
R 2324	ERJ2GEJ222X	2.2kohm
R 2325	ERJ2GEJ222X	2.2kohm
R 2326	ERJ2GE0R00XH	0ohm
R 2327	ERJ2GE0R00XH	0ohm
R 2328	ERJ2GEJ472X	4.7kohm
R 2329	ERJ2GEJ563X	56kohm
R 2332	ERJ2GEJ274X	270kohm
R 2333	ERJ2GEJ393X	39kohm
R 2334	ERJ2GEJ102X	1kohm
R 2336	ERJ2GEJ681X	680ohm
R 2337	ERJ2GEJ222X	2.2kohm
R 2340	ERJ2GE0R00XH	0ohm
R 2341	ERJ2GEJ273X	27kohm
R 2351	RY1005	∞
R 2352	ERJ2GEJ104X	100kohm
R 2353	ERJ2GEJ104X	100kohm
R 2354	ERJ2GEJ822X	8.2kohm
R 2356	ERJ2GEJ102X	1kohm
R 2357	ERJ2GEJ102X	1kohm
R 2358	ERJ2GEJ124X	120kohm
R 2365	ERJ2GEJ104X	100kohm
R 2366	ERJ2GE0R00XH	0ohm
R 2367	RY1005	∞
R 2368	ERJ2GE0R00XH	0ohm
R 2369	RY1005	∞
R 2370	ERJ2GE0R00XH	0ohm
R 2371	ERJ2GEJ332X	3.3kohm
R 2372	ERJ2GE0R00XH	0ohm
R 2373	ERJ2GEJ330X	33ohm
R 2501	ERJ3EKF4702V	47kohm
R 2502	ERJ2GEJ101X	100ohm
R 2503	ERJ2GEJ101X	100ohm

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R 2510	ERJ2GEJ101X	100ohm
R 2511	ERJ2GEJ101X	100ohm
R 2512	ERJ2GEJ101X	100ohm
R 2513	ERJ2GEJ101X	100ohm
R 2514	ERJ2GEJ101X	100ohm
R 2515	ERJ2GEJ101X	100ohm
R 2516	ERJ3EKF1002V	10kohm
R 2518	ERJ2GEJ101X	100ohm
R 2519	RY1005	∞
R 2520	ERJ2GE0R00XH	0ohm
R 2521	ERJ2GEJ102X	1kohm
U 1101	UY76131A	---
U 1201	MAX881REUB-T	---
U 1202	UH76019A	---
U 1204	UH76018A	---
U 1301	UZ76035A	---
U 1401	AN8000MS-TXL	---
U 1404	UPC8151TB-E3	---
U 1406	UY76124A	---
U 1407	SA8016	---
U 1408	TC7S04FU(TE85L)	---
U 1409	UY76148A	---
U 1501	UZ76009A	---
U 1502	TC7S04FU(TE85L)	---
U 1503	TC7S04FU(TE85L)	---
U 1504	TC75S51F(TE85L)	---
U 1505	TC75S51F(TE85L)	---
U 1601	UZ76020A	---
U 1602	UZ76019A	---
U 1604	UPG153TB-E3	---
U 1605	UZ76010A	---
U 2001	UZ76007A	---
U 2002	MB84VD22182EC-90PLS-G	---
U 2003	BH6006KU	---
U 2004	LM4864MM	---
Y 2101	MC-146A	---

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