



Exhibit 11: Tuning Procedure and Parts List

**External Radio Frequency
Power Amplifier ACOM 1011**

Model 1011

Array Solutions

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4-5. Tuning

Tuning is possible only in the **OPER** mode.

a) Preliminary information.

Tuning the amplifier involves a procedure of matching the impedance of the antenna and transmission line to the tubes characteristic load resistance. This will ensure maximum plate efficiency and RF gain at nominal output power, with minimal distortion and spurious output. Note that **REFLECTED POWER** readings depend on the antenna and transmission line impedances only, and not on amplifier tuning. If the load impedance is not a nominally resistive 50-Ohms, the **REFLECTED POWER** reading will always show a reading, no matter what the tuning settings. Proper tuning is always necessary, however, and will allow you to operate at a high power level, without distortion or any danger to the amplifier. Note also that the real OUTPUT POWER presented to the load (the antenna and transmission line) is equal to the difference between the **FORWARD** and **REFLECTED** power readings. For instance, with a 2.5:1 VSWR, readings of 800 W and 150 W **FORWARD POWER** and **REFLECTED POWER** respectively, the real OUTPUT POWER is 650 W. At very high VSWR levels, such as when no antenna is connected or a badly mismatched antenna is used, the **FORWARD** and **REFLECTED** readings will be almost equal, while the real OUTPUT POWER (the difference between them) will be nearly zero. The amplifier can operate safely as long as the **REFLECTED POWER** is LESS THAN 250 W. Matching is assured for loads presenting a VSWR of up to 3:1. Nevertheless, for some loads and bands, matching is possible at even higher VSWR levels, but the drive power must be reduced to prevent the **REFLECTED POWER** from exceeding 250W. Failure to comply with these guidelines will cause the protection circuits to trip. For example, if the antenna VSWR were 5:1, the maximum attainable forward power would be 540 W, 240 W of reflected power and real output to the antenna and transmission line of only 300 W. In the event your antenna cannot be adjusted to produce a lower VSWR, an external antenna tuner may be deployed.

CAUTION

At elevated VSWR levels, high voltages and high currents are distributed along the coaxial cable to the antenna, risking internal arcing and heat generation, and likely damage to the cable and any antenna switches that may be used. It is recommended that VSWR levels of more than 3:1 not be permitted with coaxial cable above 14 MHz.

It is advisable to adjust amplifier tuning when antennas have been changed, snow has fallen, new objects are in the near field of the antenna, etc. Such changes may affect antenna impedance.

NOTE

If you use more than one antenna on a band, the proper antenna must be selected prior to performing the tuning procedure outlined below.

CAUTION

To avoid damage not covered under warranty, do not switch the **BAND** switch knob while transmitting. As discussed above, hot switching will damage the amplifier's band switch!

CAUTION

Also, never apply drive longer than one minute continuously without pausing for at least one minute to allow the tubes to cool.

It is recommended that for initial tuning a frequency in the middle of the band be used. First, with no transceiver power applied, select the band. Then use Table 4-1 to achieve an approximate preset for both TUNE and LOAD capacitor knob settings:

Band MHz	LOAD Knob Dial	TUNE Knob Dial
1.800 - 2.000	47 - 71	54 - 32
3.500 - 4.000	34 - 56	51 - 33
7.000 - 7.300	32 - 39	36 - 30
10.100 - 10.150	62 - 63	50 - 48
14.000 - 14.350	37 - 41	38 - 31
18.068 - 18.168	41 - 43	50 - 48
21.000 - 21.450	59 - 62	16 - 10
24.890 - 24.990	50 - 52	49 - 46
28.000 - 29.700	63 - 69	23 - 10

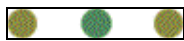
Table 4-1. Approximate tuning preset

b) Tuning Procedure.

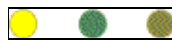
- (1) Once the antenna and band have been selected (and the **TUNE** and **LOAD** adjustments have been initially set as indicated in Table 4-1), apply between 10 and 20 W of continuous (key down CW) signal.
- (2) Look at the upper LED bar-graph (**FORWARD POWER**) and adjust the **TUNE** (right hand) capacitor for maximum indication.
- (3) Watch the TRI indicator above the **LOAD** (left hand) capacitor and turn the **LOAD** capacitor in the indicated direction to center the green LED indicator light.
- (4) Increase the drive power to get the desired nominal output; then repeat steps (2) and (3), always peaking output with the **TUNE** adjustment.

NOTE

No light on the TRI indicator means that the tuning is too far off. To correct this, turn the **LOAD** and **TUNE** knobs around the table-suggested positions until the TRI indicator illuminates.



no light:
use **TUNE** knob
for max. Power
to get any marker



tuning is far left:
turn **LOAD** knob
to the right to get
the inside markers



tuning is far right:
turn **LOAD** knob
to the left to get
inside markers



marker inside:
turn **LOAD** knob
slightly left
to center it



LOAD is tuned:
turn **TUNE** knob
to peak Forward
Power

Fig. 4-1. Using **TRI** tuning aid

The TRI indicator will not illuminate until at least 20 W of forward power (output) is achieved. In the event successful matching cannot be accomplished, check the **BAND** switch position and antenna selection. Then check the antenna VSWR at the same drive frequency.

- c) Tuning hint. A benefit of TRI is that the knob positions are virtually independent. The plate-load resistance decreases to the right and increases to the left of the TRI center. A centered tuning indication corresponds to the proper **LOAD** capacitor tuning, which presents an optimum load resistance to the tubes.

If the **LOAD** knob is turned to the left with a centered TRI, there will be more gain, but less linearity. When available drive power is insufficient or when less output but better efficiency are needed, *e.g.*, for RTTY and SSTV, this may be desirable. Tuning to the right of the center would lead to the opposite result, *i.e.*, less gain and more power attainable. Of course, this requires more drive power, more plate current, and more plate heat, which shortens tubes expected life. Off-center tuning may also be used to compensate for line (mains) voltage variations in order to maintain tubes efficiency. In that case, tune to the left when line (mains) voltage is high, or tune to the right if it is low. However, where there is more than a 10% difference from the nominal line (mains) voltage, the voltage selector inside the amplifier should be changed. See Section 2-2 (Line Voltage Selection).

ACOM1011 PARTS LIST

Nr.	Code ACOM	Description	Qty.	Delivery
1	AAL 4E45	Coil air "P"	1	Trafcom
2	ACL 12E5	Coil ceramic "L"	1	Trafcom
3	ACL 52E5	Coil ceramic "P"	1	Trafcom
4	AFD 181	RF Choke grids	1	
5	AFD 201	RF Choke antenna	2	
6	AFD 220	RF Choke HV 22uH Setron-Altronics: SMC-230 M-01	1	Setron - Altronics
7	AFT TA	Transformer current 1010	1	
8	AMM 12V	Blower 1011	1	Trafcom
9	AMX 151	Choke RF anode 1011	1	Trafcom
10	AMX 4CX250	Tube socket for 4CX250B	2	
11	AMX CL	Cap air variable LOAD 1010	1	Trafcom
12	AMX CT	Cap air variable TUNE 1010	1	Trafcom
13	APC CAB	RF Choke mains	1	Trafcom
14	AXT 1KVA	Transformer mains 1010	1	Trafcom
15	CEH 107M	Cap el. Alum. 100uF 450V Panasonic EET-UQ2W101BA; Hitano ELP series	8	Digi-Key P11933-ND; Hitano - MT1
16	CEH 226M	Cap el. Alum. 22uF 160V Panasonic ECA-2CM220; Hitano - ECR series	1	Panasonic - Digi-Key P5323-ND; Hitano - MT1
17	CEH 227M	Cap el. Alum. EA-15 220µF 450V	1v	Conis
18	CEH 475M	Cap el. Alum. 4,7uF 400V Hitano ECR4R7T2GB5 Nichicon UVR2G4R7MPD; Conis EA-20 (EA-19, EA-12)	1	Hitano - MT1; Nichicon - Digi-Key 493-1229-ND; Conis
19	CEL 105M	Cap el. Alum. 1uF 16V 2mm Panasonic ECE-A1HKS010; Hitano - ECR series	4	Panasonic - Digi-Key P993-ND; Hitano - MT1
20	CEL 106M	Cap el. Alum. 10uF 10V 2mm (max Ø7mm); Panasonic ECA-1CM100; Hitano - ECR series	1	Panasonic - Digi-Key P5134-ND; Hitano - MT1
21	CEL 107M	Cap el. Alum. 100uF 16V 2,5mm (max Ø6,5mm); Panasonic ECA-1CM101; Hitano - ECR series	2	Panasonic - Digi-Key P5138-ND; Hitano - MT1
22	CEL 338M	Cap el. Alum. 3300uF 25V 7,62mm (max Ø17x38mm); Panasonic ECA-1EM332; Hitano - ECR series	1	Panasonic - Digi-Key P5158-ND; Hitano - MT1
23	CKC 101K	Cap ceramic K15Y-1a 100pF±10% 3,5kV M1500 4kVA	1	Russia
24	CKD 100J	Cap ceramic disc type I - 10pF ±5% NPO 500VDC; 5mm; CONIS CD-IB NPO 10pF ±5% 500V; HITANO TCH2H100JK555B; AVX 5AQ100JOAQE; Philips (BC) 2222 653 10 109; Murata DD05-63CH100D500; Philips D100D20COGLAAAA; Panasonic ECC-D2H100DC5	2	Conis; HITANO - MT1; AVX - KOMET, ALTRONICS; BC - Altronics; Murata - CODICO; BC - Digi-Key 1355PH-ND; Panasonic - Digi-Key P4400A-ND
25	CKD 100J	Cap ceramic disc type I - 10pF ±5% NPO 50V 5mm; CONIS CD-IB NPO 10pF ±5% 50V; HITANO TCH1H100JK555B; AVX 5AK100JOAQE; BC 2222 683 10109; Murata DD104-63CH100J50; BC D100D20C0GH63L6	1	Conis; HITANO - MT1; AVX - KOMET, ALTRONICS; BC - Farnell 303-410; Murata - CODICO; BC - Digi-Key 1326PH-ND

Nr.	Code ACOM	Description	Qty.	Delivery
26	CKD 103M	Cap ceramic disc type II - 10nF $\pm 20\%$ Z5U/E2 500VDC; ϕ 12mm max; 5mm; HITANO HE2H103ML516B; AVX 5SQ103MAHQD CERA-MITE 5GASS10	10	HITANO - MT1; AVX - KOMET, ALTRONICS; CERA-MITE; BC - Digi-Key 1424PH-ND
27	CKD 131J	Cap ceramic disc type I NPO 130pF $\pm 5\%$ 2kV/1,5kVA (ϕ 17mm)	4	Conis
28	CKD 131J	Cap ceramic disc type I NPO 130pF $\pm 5\%$ 2kV/2,5kVA (ϕ 22mm)	1	Conis
29	CKD 222K	Cap ceramic disc 2,2nF $\pm 20\%$ 3kVDC ϕ 22mm 10mm Russia K15-5 2200pF H20 3kV; HITANO KB3F222MK058B; MURATA DE1307B222K3K; Panasonic ECKD3F222KBP; CERA-MITE 30TSD22	2	Russia; HITANO - MT1; Murata - CODICO; Panasonic - Farnell 578-666; CERA-MITE Digi-Key P4512A-ND
30	CKD 222M	Cap ceramic disc 2,2nF $\pm 20\%$ 6kV 10mm; Panasonic ECKD3J222MDU; HITANO KB3J222M-L018B; Murata DECE33J222ZC48	6	HITANO - MT1; Panasonic - Farnell 578-769; Murata - CODICO or Farnell 498-506
31	CKD 470J	Cap ceramic disc type I NPO 47pF $\pm 5\%$ 500V 5mm; HITANO TCH2H470J-K556B; CONIS CD-IB NPO 47pF $\pm 5\%$ 500VDC; Panasonic ECC-D2H470JC5; BC Components D470J29COGLAAAA	1	HITANO - MT1; Panasonic - Digi-Key P4408A-ND; BC - Digi-Key 1362PH-ND
32	CKD 5E6J	Cap ceramic disc type I - 5,6pF ± 0.25 pF NPO 1kV 5mm; Hitano TCH3A5P6CK556B	2	Hitano - MT1
33	CKD 821M	Cap ceramic bare disc 820pF $\pm 10\%$ 1kV ϕ 9x4mm	18	
34	CKG 221J	Cap glass-ceramic type KC-1a 220pF 5% M150 500V	1	Russia
35	CKS 102K	Cap ceramic SMD size 0805 1nF $\pm 10\%$ 50V X7R; Kemet C0805C102K5RACTU; BC Components 0805B102K500BT	13	Kemet - Digi-Key 399-1147-1-ND; BC - Digi-Key BC1284CT-ND
36	CKS 103K	Cap ceramic SMD size 0805 10nF $\pm 10\%$ 50V X7R; AVX 08055C103KAT2A	11	AVX - Digi-Key 478-1383-1-ND
37	CKS 104M	Cap ceramic SMD size 1206 100nF $\pm 20\%$ 50V X7R; Kemet C1206C104M5RACTU; BC Components 1206B104K500BT	7	Kemet - Digi-Key 399-1248-1-ND; BC - Digi-Key BC1326CT-ND
38	CKS 270J	Cap ceramic SMD size 1206 NPO 27pF $\pm 5\%$ 50V; Panasonic ECU-V1H270JCM; BC Components VJ1206A270JXACW1BC	2	Panasonic - Digi-Key PCC270CCT-ND; BC - Digi-Key BC1308CT-ND
39	CKS 473M	Cap ceramic SMD size 1206 47nF $\pm 20\%$ 50V; AVX 12065C473KAT2A	11	AVX - Digi-Key 478-1550-1-ND
40	CKS 560J	Cap ceramic SMD size 0805 NP0 56pF $\pm 5\%$ 50V; Panasonic ECJ-2VC1H560J	4	Digi-Key PCC560CGCT-ND
41	CTK 111K	Cap trimmer 6/110pF N100 250V Violet; PHILIPS 222 808 31101	1	AVNET Order Code 014019
42	DEG 2X5	LED rect. green diff. 2,0x5mm, Kingbright L-113GDT	20	Comet Electronics
43	DEG 3DIA	LED ϕ 3mm green diff. Fairchild HLMP-1790	3	COMET-MLL-30631; Fairchild - Digi-Key HLMP1790-ND; Mouser 512-HLMP1790

Nr.	Code ACOM	Description	Qty.	Delivery
44	DEG 5DIA	LED Φ 5mm green diff. CQY72 (VQA23); Fairchild MV6451; HLMP-4740	1	PHILIPS (RFT); Fairchild - Digi-Key MV6451-ND; HLMP4740-ND; Mouser 512-MV6451; 512-HLMP4740
45	DER 2X5	LED rect. red diff. 2,0x5mm Kingbright L-113IDT	5	Comet Electronics
46	DER 3DIA	LED Φ 3mm red diff. Fairchild HLMP-K150	1	COMET-MLL-30331; Fairchild - Digi-Key HLMPK150-ND; Mouser 512-HLMPK150
47	DER 5DIA	LED Φ 5mm red diff. CQY40 (VQA13); Fairchild MV6951; HLMP-D150A	2	PHILIPS (RFT); Fairchild - Digi-Key MV6951-ND; HLMPD150A-ND; Mouser 512-MV6951; 512-HLMPD150A
48	DEY 2X5	LED rect. yellow diff. 2,0x5mm Kingbright L-113YDT	3	Comet Electronics
49	DEY 3DIA	LED Φ 3mm yellow diff. Fairchild HLMP-1719	4	COMET-MLL-30531; Fairchild - Digi-Key HLMP1719-ND; Mouser 512-HLMP1719
50	DGD 311	Diode germanium D311	2	RUSSIA
51	DSD BAV99	Diode Si SMD case SOT-23 type BAV99	3	Philips (marking A7p); Diodes Inc. - Digi-Key BAV99DICT-ND
52	DSH 7004	Diode Schottky SMD case SOT23 type BAS70-04; Thomson BAS70-04FILM	1	Thomson - Digi-key 497-2516-1-ND
53	DSR S1A	Diode Si SMD case DO214AC (DO214BA, DO214AA); type S1A (GF1A)	4	GS; FCH - Farnell 165-669; 547-499; 251-460 (GS - Digi-Key S1ADICT-ND; GF1AGICT-ND)
54	DSR S1G	Diode Si SMD case DO214AC (DO214BA, DO214AA); type S1G (GF1G)	3	Digi-Key S1GDICT-ND
55	DSR S1M	Diode Si SMD case DO214AC (DO214BA, DO214AA); type S1M (GF1M)	23	Digi-Key S1MDICT-ND
56	DSX 4E7	Diode Zener 4,7V SMD case SOT-23 type BZX84C4V7	3	Philips (marking Z1p); Vishay - Digi-Key BZX84C4V7DICT-ND
57	DSZ 120	Diode Zener SMD case SOT-23 type BZX84C12 12V/03W; Diodes Inc. BZX84C12-7 (marking KY2)	5	Diodes Inc. - Digi-Key BZX84C12DICT-ND
58	DSZ 271	Diode Zener BZT03C270 270V/3W	1	www.viewcom.force9.co.uk; www.rapidelectronics.co.uk; www.usbid.com; angliac.co.uk
59	DSZ 680	Diode Zener BZV85C68 (BZX85C68, 1N4760A) 68V/1W	1	Microsemi - Digi-Key 1N4760AMSCT-ND
60	FHP 10A	Fuse Holder snap-in 5x20mm 10A/250VAC; Canal WTN1114R2	2	www.canal.com.tw
61	FHS 20	FUSE HOLDER 5x20mm ZH1 (ECLIPSE CFH02/W p/nJVS) (Reichelt PL112000) (Multicomp MCHTC-15M ref.146-123)	4	PULSATOR (ECLIPSE, Reichelt, Multicomp-Italy)

Nr.	Code ACOM	Description	Qty.	Delivery
62	FLQ 10A	Fuse 5x20mm Fast (Quick Blow), Littelfuse 0217010.H; Wickmann 1942100000	2	Littelfuse - Digi-Key F955-ND; Wickmann - Digi-Key WK2071-ND
63	FLQ 6R3A	Fuse 6,3A 250V 5x20mm Fast (Quick Blow), Littelfuse 021706.3TX832 (021706.3H); Wickmann 1931630000; SCHURTER 0034.1524; MULTICOMP MCF05G-6.3A	2	Littelfuse - Farnell 533555; Littelfuse - Digi-Key F953-ND; Wickmann - Digi-Key WK1066-ND; SCHURTER - Farnell p/n 4295031; Multicomp - Farnell p/n 799970
64	FLS 08ASB	Fuse 0.8A 250V Antisurge (Slow Blow, Time Lag) Φ 5x20mm; Bussmann type S504-800mA	2	Digi-Key: BK/S504-800MA-ND; Farnell: p/n 348-2066 (x 1000); Farnell: p/n 534-158
65	FLS 2ASB	Fuse 2A 250V SLOW BLOW (Time Lag) Φ 5x20mm; Wickmann 1951200000; Littelfuse 218002.H	1	Wickmann - Digi-Key WK5057-ND; Littelfuse - Digi-Key F978-ND
66	FLS 5ASB	Fuse 5A 250V SLOW BLOW (Time Lag) Φ 5x20mm; Wickmann 1951500000; Littelfuse 0218005.H	1	Wickmann - Digi-Key WK5063-ND; Littelfuse - Digi-Key F982-ND
67	FTF 28	Toroide ferrite NF28 μ =28 25x15x10mm	1	Samel 90
68	FTF 125	Toroide ferrite 12,7x7,9x6,35 μ =125 (80); Fair-Rite 59 61 001 101; Amidon FT-50A-61; Siemens B64290-P44-X1	2	Fair-Rite - Dexter; Amidon; Siemens
69	FTF 1700	Tube ferrite 16x9,1x28mm μ =1700 Steward 38B0631-100; or 26B0631-100 μ =850	1	Steward - MT1
70	FTF 2000	Toroide ferrite K 16x8x6mm μ =2000	6v	Samel 90
71	HMZ 0E22	Coil air 180nH	1	Trafcom
72	HMZ 0E3	Coil air 300nH	1	Trafcom
73	HMZ 0E1	Coil air 65nH	1	Trafcom
74	JBF 3	AC POWER INLET Snap-in Mountable 10A 250VAC IEC320/EN60320; Canal 2111-P-Q	1	www.canal.com.tw
75	JCF 1	Connector female panel mount 6,5mmRCA Phono Jack; Lumberg type BTO 1	1	Lumberg - Farnell 1217027
76	JCF 239	Connector coaxial female panel mount square flange type UHF SO239 p/n 83-1R-RFX	3	Amphenol; Digi-Key ARFX1005-ND
77	JRF 2	Jumper 2 contacts 2,54mm Shorting Jumpers (Shunts) 3M 929950-00	1	3M; Digi-Key p/n 929950-00-ND
78	JRF 3	Connector cable 3 receptacles CONNECTOR MTA156 3 IDC CONTACTS ORANGE 18AWG 3-643817-3-new (640426-3-old)	1	AMP; Digi-Key p/n A31356-ND-new; A19580-ND-old
79	JRF 4	Connector cable 4 receptacles white MTA100 12 IDC Receptacle white 24AWG 3-643814-4-new (640441-4-old)	1	AMP; Digi-Key p/n A31019-ND-new; A1902-ND-old
80	JRF 5	Connector cable 5 receptacles white MTA100 5 IDC Receptacle white (AWG24) 3-643814-5-new (640441-5-old)	1	AMP; Digi-Key p/n A31020-ND-new; A19021-ND-old
81	JRF 10	Connector cable 10 rh. white MTA100 10 IDC Receptacle white (AWG24) 4-643814-0-new (1-640441-0-old)	3	AMP; Digi-Key p/n A30963-ND-new; A1905-ND-old
82	JRF 12	Connector cable 12 receptacles white MTA100 12 IDC Receptacle white 24AWG 4-643814-2-new (1-640441-2-old)	3	AMP; Digi-Key p/n A30964-N-new; A19025-ND-old

Nr.	Code	ACOM	Description	Qty.	Delivery
83	JRM	2	Connector 2 pins (2x36) Straight Dual Row Male Header Black, 3M 929836-09-36	1	3M; Digi-Key p/n929836-09-36-ND
84	JRM	3	Connector right angle 3 pins solder PIN HEADER MTA156 3 POS RIGHT ANGLE TINNED AMP 640385-3	1	AMP; Digi-Key p/n A19876-ND
85	JRM	4	Connector PIN HEADER MTA100 4 RIGHT ANGLE POSTS FRICTION LOCK AMP p/n 640457-4	1	AMP; Digi-Key p/n A1927-ND
86	JRM	5	Connector PIN HEADER MTA100 5 STRAIGHT POST FRICTION LOCK 640456-5	1	AMP; Digi-Key p/n A19471-ND
87	JRM	8	Connector 0.64mm Square Header Single Row 8 Right Angle Pins, SULLINS p/n PZC08SBAN	1	SULLINS; Digi-Key p/n S1111-08-ND
88	JRM	10	Connector PIN HEADER MTA100 10 RIGHT ANGLE POSTS FRICTION LOCK AMP p/n 1-640457-0	1	AMP; Digi-Key p/n A1930-ND
89	JRM	10	Connector PIN HEADER MTA100 10 STRAIGHT POST FRICTION LOCK 1-640456-0	2	AMP; Digi-Key p/n A1925-ND
90	JRM	12	Connector PIN HEADER MTA100 12 RIGHT ANGLE POSTS FRICTION LOCK AMP p/n 1-640457-2	2	AMP; Digi-Key p/n A19485-ND
91	JRM	12	Connector PIN HEADER MTA100 12 STRAIGHT POSTS FRICTION LOCK AMP p/n 1-640456-2	1	AMP; Digi-Key p/n A19475-ND
92	JSM	1	Connector AMP FASTON TAB 6,3mmx0,8mm	1	Trafcom (AMP 216926-1)
93	KSH	2X8A	Relay 2 form A Ag+Ni; Finder - 41.52.9.012.0311 - hermetic (41.52.9.012.0310 - non hermetic); Potter & Brumfield or Schrack - RTE44012(F) - hermetic; (RT444012(F) - non hermetic)	1	Finder; P&B, Schrack - Tyco Electronics
94	KSH	2X8A	Relay 29x12.7x15.7mm 2x8A 2 form C Ag+Au; Finder - 41.52.9.012.5011 - hermetic (41.52.9.012.5010 - non hermetic); Potter & Brumfield or Schrack - RTE25012(F) - hermetic; (RT425012(F) - non hermetic)	2	Finder; P&B, Schrack - Tyco Electronics
95	KSH	2X8A	Relay 29x12.7x15.7mm 2x8A 2 form C Ag+Ni; Finder - 41.52.9.012.0011 - hermetic (41.52.9.012.0010 - non hermetic); Potter & Brumfield or Schrack - RTE24012(F) - hermetic; (RT424012(F) - non hermetic)	1	Finder; P&B, Schrack - Tyco Electronics
96	KSL	TQ2	Relay 2 form CA-12WK (TQ2E-12V)	1	TAKAMISAWA-AVNET, No.33982 (Aromat - Digi-Key Part No. 255-1002-ND)
97	LFD	220	RF choke 22uH; ϕ 4.3x10mm max J.W.Miller Magnetics 77F220K; 78F220J	2	Miller - Digi-key 77F220K-ND; M7829-ND
98	RAH	105J	Resistor HV 1MOhm \pm 5% 0,25W; WELWYN type MH25-1MJ1 1,6kVAC	1	Welwyn - Farnell 4659818
99	RAM	393J	Resistor 39kOhm \pm 5% 0,25W max ϕ 3,3x9mm; CFR-25JB-39K	1	Yageo - Digi-Key 39KQBK-ND
100	RBC	470J	Resistor carbon composite 47-Ohm 1/2W 5% ϕ 3,6x9,5mm Tyco Electronics CBT50J47R	5	Tyco - Farnell 1265109

Nr.	Code ACOM	Description	Qty.	Delivery
101	RCM 104J	Resistor 100kOhm $\pm 5\%$ 1W; BC Components type PR01 cat.nr. 2322 193 13 104 (5073NW100K0J12AFX - American); Yageo RSF100JB-100K;	2	BC - Digi-key BC100KW-1CT-ND; Yageo - Digi-key - 100KW-1-ND
102	RCM 105J	Resistor 1MOhm $\pm 5\%$ 1W; BC Components type PR01 cat.nr. 2322 193 13 105 (5073NW1M000J12AFX - American); Yageo RSF100JB-1M0	3	BC - Digi-key BC1.0MW-1CT-ND; Yageo - Digi-key - 1.0MW-1-ND
103	RCM 153J	Resistor 15kOhm $\pm 5\%$ 1W; BC Components type PR01 cat.nr. 2322 193 13 153 (5073NW15K00J12AFX - American); Yageo RSF100JB-15K; Panasonic ERG-1SJ153	2	BC - Digi-key BC15KW-1CT-ND; Yageo - Digi-Key 15KW-1-ND; Panasonic - Digi-Key P15KW-1BK-ND
104	RCM 391J	Resistor 390 Ohm $\pm 5\%$ 1W; BC Components type PR01 cat.nr. 2322 193 13 391 (5073NW390R0J12AFX - American); Yageo RSF100JB-390R; Panasonic ERG-1SJ391	2	BC - Digi-Key BC390W-1CT-ND; Yageo - Digi-Key 390W-1-ND; Panasonic - Digi-Key P390W-1BK-ND
105	RCM 470K	Resistor 47 Ohm $\pm 10\%$ 1W max $\phi 4,5 \times 12 \text{mm}$; BC Components type PR01 cat.nr. 2322 193 13 479 (5073NW47R00J12AFX - American); Yageo RSF100JB-47R; Panasonic ERG-1SJ470	1	Yageo - Digi-Key 47W-1-ND; Panasonic - Digi-Key P47W-1BK-ND; BC - Digi-Key BC47W-1CT-ND
106	RCM 472J	Resistor 4,7kOhm $\pm 5\%$ 1W; BC Components type PR01 cat.nr. 2322 193 13 472 (5073NW4K700J12AFX - American); Yageo RSF100JB-4K7; Panasonic ERG-1SJ472	3	BC - Digi-Key BC4.7KW-1CT-ND; Yageo - Digi-Key 4.7KW-1-ND; Panasonic - Digi-Key P4.7KW-1BK-ND
107	RCP 2740F	Resistor non inductive, precise 27,4 Ohm $\pm 1\%$ 1W; $\phi 5 \times 12 \text{mm}$ max; 15mm; BC Components type MBE 0414 p/n 2312 92.12749	2	BC - Setron/ Altronics
108	RDM 154J	Resistor metal oxide 150kOhm $\pm 5\%$ 2W (3W if carbon film); Yageo RSF200JB-150K; BC Components 5083NW150K0J12AFX	6	Digi-Key 150KW-2-ND; BC150KW-2CT-ND
109	RDM 154J	Resistor metal oxide 150kOhm $\pm 5\%$ 2W (3W if carbon film); Yageo RSF200JB-150K; BC Components 5083NW150K0J12AFX	2	Digi-Key 150KW-2-ND; BC150KW-2CT-ND
110	RDM 683J	Resistor 68kOhm $\pm 5\%$ 2W; Yageo RSF200JB-68K; MULTICOMP MCF 2W 68K	4	Yageo - Digi-Key 68KW-2-ND; MULTICOMP - Farnell 489-785
111	REC 121J	Resistor non inductive 120 Ohm $\pm 5\%$ 3W ERG-3SJ121; MOLDED A/B RC42GF121K	2	Panasonic: Digi-Key P120W-3BK-ND; (A. BRADLY USA)
112	REW 2E2J	Resistor wire wound 2,2 Ohm $\pm 5\%$ 3W max $\phi 6,5 \times 15 \text{mm}$; BC Components type AC03 cat.nr. 2322 329 03 228; can be 2,0 Ohm 2322 329 03 208	1	BC - Setron/ Altronics; 2,0 Ohm - Digi-Key AC3W2.0TB-ND
113	RFW 0R22J	Resistor wire wound 0,22Ohm $\pm 5\%$ 5W, ceramic case 10x10x22mm, axial; Xicon 280-CR5-0.22-RC; Vishay/Dale CP0005R2200JE14; IRC CAW5R220JLF	1	Xicon - Mouser 280-CR5-0.22-RC; Vishay - Mouser 71-CP0005R2200JE14; IRC - Farnell 1457947
114	RFW 6E8J	Resistor wire wound 6,8 Ohm 5% 4W $\phi 5,6 \times 13 \text{mm}$ WELWYN WP4S-6R8JA2	1	Farnell 1219263

Nr.	Code ACOM	Description	Qty.	Delivery
115	RFW 6E8J	Resistor wire wound 6,8 Ohm 5% 5W Φ7.5x18mm VISHAY DRALORIC AC05000006808JAC00	1	Farnell 1735129
116	RGW 220K	Resistor wire wound impulse 22 Ohm ±10% 7W (max Φ9x55mm); HTR HCA7WIK22R	3	HTR - India
117	RHC 500J	Resistor RF power 50 Ohm 5% 100W 25x25mm	1	HIS OOD - Sofia
118	RSM 102J	Resistor SMD size 1206 1kOhm ±5% ; Yageo 9C12063A1001JLHFT	8	Yageo - Digi-Key 311- 1.0KECT-ND
119	RSM 103J	Resistor SMD size 1206 10kOhm ±5% ; Yageo 9C12063A1002JLHFT	14	Yageo - Digi-Key 311- 10KECT-ND
120	RSM 121J	Resistor SMD size 1206 120 Ohm ±5%; Panasonic ERJ-8GEYJ121V; Yageo 9C12063A1200JLHFT	6	Panasonic - Digi-Key P120ECT-ND; Yageo - Digi- Key 311-120ECT-ND
121	RSM 122J	Resistor SMD size 1206 1,2kOhm ±5% ; Yageo 9C12063A1201JLHFT	1	Yageo - Digi-Key 311- 1.2KECT-ND
122	RSM 153J	Resistor SMD size 1206 15kOhm ±5%; Yageo 9C12063A1502JLHFT	3	Yageo - Digi-Key 311- 15KECT-ND
123	RSM 154J	Resistor SMD size 1206 150kOhm ±5% ; Yageo 9C12063A1503JLHFT	4	Yageo - Digi-Key 311- 150KECT-ND
124	RSM 221J	Resistor SMD size 1206 220 Ohm ±5%; Panasonic ERJ-8GEYJ221V; Yageo 9C12063A2200JLHFT	1	Panasonic - Digi-Key P220ECT-ND; Yageo - Digi- Key 311-220ECT-ND
125	RSM 222J	Resistor SMD size 1206 2,2kOhm ±5% ; Yageo 9C12063A2201JLHFT	7	Yageo - Digi-Key 311- 2.2KECT-ND
126	RSM 223J	Resistor SMD size 1206 22kOhm ±5%; Yageo 9C12063A2202JLHFT	1	Yageo - Digi-Key 311- 22KECT-ND
127	RSM 223J	Resistor SMD size 1206 22kOhm ±5%; Yageo 9C12063A2202JLHFT	2	Yageo - Digi-Key 311- 22KECT-ND
128	RSM 224J	Resistor SMD size 1206 220kOhm ±5%; Yageo 9C12063A2203JLHFT	5	Yageo - Digi-Key 311- 220KECT-ND
129	RSM 270J	Resistor SMD size 1206 27 Ohm ±5%; Yageo 9C12063A27R0JLHFT	2	Yageo - Digi-Key 311-27ECT- ND
130	RSM 271J	Resistor SMD size 1206 270 Ohm ±5%; Yageo 9C12063A2700JLHFT	7	Yageo - Digi-Key 311- 270ECT-ND
131	RSM 333J	Resistor SMD size 1206 33kOhm ±5% ; Yageo 9C12063A3302JLHFT	1	Yageo - Digi-Key 311- 33KECT-ND
132	RSM 471J	Resistor SMD size 1206 470 Ohm ±5%; Yageo 9C12063A4700JLHFT	1	Yageo - Digi-Key 311- 470ECT-ND
133	RSM 472J	Resistor SMD size 1206 4,7kOhm ±5%; Panasonic ERJ-8GEYJ472V; Yageo 9C12063A4701JLHFT	3	Panasonic - Digi-Key P4.7KECT-ND; Yageo - Digi- Key 311-4.7KECT-ND
134	RSM 473J	Resistor SMD size 1206 47kOhm ±5% ; Yageo 9C12063A4702JLHFT	5	Yageo - Digi-Key 311- 47KECT-ND
135	RSM 474J	Resistor SMD size 1206 470kOhm ±5% ; Yageo 9C12063A4703JLHFT	1	Yageo - Digi-Key 311- 470KECT-ND
136	RSM 623J	Resistor SMD size 1206 62kOhm ±5%; Panasonic ERJ-8GEYJ623V; Yageo 9C12063A6202JLHFT	2	Panasonic - Digi-Key P62KECT-ND; Yageo - Digi- Key 311-62KECT-ND
137	RSM 681J	Resistor SMD size 1206 680 Ohm ±5% ; Yageo 9C12063A6800JLHFT	1	Yageo - Digi-Key 311- 680ECT-ND

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138	RSM 682J	Resistor SMD size 1206 6,8kOhm $\pm 5\%$; Yageo 9C12063A6801JLHFT	1	Yageo - Digi-Key 311-6.8KECT-ND
139	RSM 820J	Resistor SMD size 1206 82 Ohm $\pm 5\%$; Yageo 9C12063A82R0JLHFT	4	Yageo - Digi-Key 311-82ECT-ND
140	RSP 1001F	Resistor precise SMD size 1206 1kOhm $\pm 1\%$; Yageo 9C12063A1001FKHFT	1	Yageo - Digi-Key 311-1.00KFCT-ND
141	RSP 1002F	Resistor SMD precise, p-p 1206 10kOhm $\pm 1\%$; Yageo 9C12063A1002FKHFT	3	Yageo - Digi-Key 311-10.0KFCT-ND
142	RSP 1240F	Resistor SMD size 1206 124 Ohm $\pm 1\%$; Vishay Dale CRCW1206124RFKEA	1	Farnell 1653058
143	RSP 3012F	Resistor SMD precise, p-p 1206 30,1kOhm $\pm 1\%$; Yageo 9C12063A3012FKHFT	1	Yageo - Digi-Key 311-30.1KFCT-ND
144	RSP 4020F	Resistor SMD precise, p-p 1206 402 Ohm $\pm 1\%$; Yageo 9C12063A4020FKHFT	1	Yageo - Digi-Key 311-402FCT-ND
145	RTM 103K	Resistor trimmer 10kOhm Type Piher PT6V Laydown (Panasonic EVN-D8AA03B14)	4	Piher; Burklin 66E5812, AVNET 018537; (Digi-Key D4AA14-ND)
146	RTM 503K	Resistor trimmer 50kOhm Type Piher PT6V Laydown (Panasonic EVN-D8AA03B54)	1	Piher; Burklin 66E5816, AVNET 018539; (Digi-Key D4AA54-ND)
147	RVA 320V	Varistor 230VAC/300VDC 360V@1mA 60J 4500Apk dia. 16,5mm; Panasonic ERZ-V14D361; Epcos B72214S231K101; Littelfuse V230LA20A	1	Panasonic - Digi-Key P7265-ND; Epcos - USBid; Littelfuse - Newark
148	SWK BTN	Switch button black ITT ISOSTAT 532-010-001 (E-SWITCH 520-02-1)	3	Farnell 151-145 (Digi-Key EG1411-ND)
149	SWM 10A	Micro-Switch Snap Action 10A/250VAC; Canal M141T02-A30404D	1	www.canal.com.tw
150	SWP XXX	Switch mains round 2 form A, 10A/250V DPST mount hole $\phi 20$ mm, ext. dia. $\phi 23$ mm; Canal MR210-R2A-BB; Cherry RRA32H3FBBNN	1	www.canal.com.tw; www.cherrycorp.com
151	SWT T23	Thermostat 50oC 10A 250VAC Honest-Well type T23B050AXR7-15	1	Honest-Well Co., Ltd. honest-well.com.tw
152	TFN 210	Transistor MOSFET case TO252 (D-Pak, SOT428) type IRFR210 (IRFR214,IRFR220)	1	International Rectifier - Digi-Key IRFR210-ND
153	TFN 324	Transistor MOSFET case SOT223 type BSP324	1	Infineon - Farnell 4109120
154	TFN 820	Transistor MOSFET IRF820	1	IR -Digi-Key IRF820PBF-ND
155	TFP 9310	Transistor MOSFET case TO252 (D-Pak, SOT428) type IRFR9310PBF	1	International Rectifier - Digi-Key IRFR9310-ND; Farnell 8649910
156	TSN 19	Transistor npn case SOT-23 type BCX19	4	Zetex - Digi-Key BCX19CT-ND; Rohm (marking GU1)
157	TSP 17	Transistor pnp case SOT-23 type BCX17	2	Rohm (marking GT1) Digi-Key BCX17CT-ND
158	TSP TA92	Transistor pnp case SOT-23 type MMBTA92 (FMMTA92,BF821)	2	Fairchild - Digi-Key MMBTA92-FDICT-ND; Philips (marking 7Dp, 7Dt)
159	UCL 7805	Integrated circuit uA7805 (case TO220)	1	Fairchild - Digi-Key LM7805CT-ND; MC7805CT-ND

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160	USH ATM8	Integrated circuit SMD case 32TQFP type ATmega8(L) microcontroller; Atmel ATMEGA8L-8AC; ATMEGA8L-8AI	1	Atmel - Digi-Key ATMEGA8L-8AC-ND; ATMEGA8L-8AI-ND
161	USL 336	Integrated circuit SMD case SO8 type LM336D	1	Thomson (AVNET 021146)
162	USL 358	Integrated circuit SMD case SO8 type LM358D	1	Thomson; TI - Digi-Key 296-1014-5-ND
163	USL 393	Integrated circuit SMD case SO8 type LM393D	1	Thomson; TI - Digi-Key 296-1015-5-ND
164	USL 2003	Integrated circuit SMD case SO16 type ULN2003D; Toshiba ULN2003AFW	2	Thomson; Toshiba - Digi-Key ULN2003AFW-ND
165	USL T132	Integrated circuit SMD case SO14 type CD74HCT132; TI - CD74HCT132M96	1	TI - Digi-Key 296-12831-1-ND
166	USM T165	Integrated circuit SMD case SO16 type 74HCT165; TI - CD74HCT165M	1	TI - Digi-Key 296-9258-5-ND
167	USM 4094B	Integrated circuit SMD case SO16 type HEF4094B; TI CD4094BPWR	2	568-1706-5-ND
168	USM C5921	Integrated circuit SMD case DAP 32 kp. (thermal pad) type TLC5921; TI - TLC5921DAP	1	TI - Digi-Key 296-10349-5-ND
169	VTT 4CX250	Vacuum tube 4CX250B (7203)	2	China
170	YK 4000	Resonator ceramic 4000kHz 5,08mm	1	Comet Electronics