

Synthesizer & VCO RoHS Application Note

M2032
Rev D

Overview:

M/A Com is committed to full compliance with the RoHS (Restriction of the use of certain Hazardous Substances) and WEEE (Waste from Electrical and Electronic Equipment) directives.

M/A Com began the transition to lead free back in 2001. As a result all of M/A Com's Synthesizer and VCO (MVS) products are constructed on RoHS compliant PCBs and utilize lead free solder.

Currently, the only non-RoHS compliant material is some of the passive and IC components used within the module. They fall into two categories:

- Lead contained within the plating of various chip components;
- Brominated fire retardants used in the plastic molding compound of some IC components.

M/A Com is currently in the process of switching to 100% RoHS compliant components. Our plan is that every synthesizer or VCO manufactured after January 1, 2006 will be fully RoHS compliant. In the meantime, we will create on request new part numbers for any customer who requires a RoHS compliant part. All RoHS compliant MVS parts will be shipped in boxes with a "Pb-free" label.

RoHS Compliant Part Number:

MAVC-xyxxx-xxxxxx

y = "0" for RoHS compliant parts

y = "1" for non-RoHS compliant parts

Material Details:

PCB: FR4

PCB Plating: 0.15µm of Au over a 0.5µm Ni barrier.

Solder: SN95.5/Ag4.0/Cu0.5

Cover: mild steel

Solder Profile:

All M/A Com MVS products will withstand a reflow profile with a maximum temperature of 250°C for up to 30 seconds.

Moisture Sensitivity Level: 2

Qualification:

1. Full reliability qualification was completed to verify the new solder and PCB plating scheme. This qualification included thermal shock, life testing, autoclave, mechanical shock and ESD. Report available upon request.
2. Full reliability qualification was completed to verify the maximum reflow profile. This qualification included thermal shock, vibration and mechanical shock. Report available upon request.

**RoHS Compliant Part Number
Cross Reference List**

Old Part Number	RoHS Compliant P/N
MASYVS0006-0265T	MAVC-060002-120265
MASYVS0006-0638	MAVC-060200-260638
MASYVS0006-0693	MAVC-060200-260693
MASYVS0006-1035	MAVC-060100-261035
MASYVS0006-1106T	MAVC-060240-131106
MASYVS0006-1710	MAVC-060050-131710
MASYVS0006-1712	MAVC-060100-261712
MASYVS0006-2034	MAVC-060040-132034
MASYVS0006-2044	MAVC-060100-262044
MASYVS0006-2059	MAVC-060040-132059
MASYVS0006-2142	MAVC-060100-262143
MASYVS0006-2262	MAVC-060050-132262
MASYVS0045	MAVC-060200-132140
MASYVS0060-0943	MAVC-060200-260943
MASYVS0060-1097	MAVC-060200-261097
MASYVS0060-1154	MAVC-060200-261154
MASYVS0060-1549	MAVC-060200-261549
MASYVS0060-1632	MAVC-060200-261632
MASYVS0060-1681	MAVC-060200-261681
MASYVS0060-1749	MAVC-060200-261749
MASYVS0060-1842	MAVC-060200-261842
MASYVS0061-0286	MAVC-060500-130286
MASYVS0061-0778	MASYVS0061-0778LFT
MASYVS0061-1117	MASYVS0061-1117LFT
MASYVS0061-1581	MASYVS0061-1581LFT
MASYVS0061-1668	MASYVS0061-1668LFT
MASYVS0069-0942	MAVC-690200-930942
MASYVS0069-1096	MAVC-690200-931096
MASYVS0069-1548	MAVC-690200-931548
MASYVS0069-1842	MAVC-690200-931842
MASYVS0090-0765	MAVC-090200-060765
MASYVS0090-0791	MAVC-090200-060791
MASYVS0090-0827	MAVC-090200-060827
MASYVS0090-0853	MAVC-090200-060853
MAVCVS0001-1690H	MAVC-010000-001690
MAVCVS0004-2180H	MAVC-040000-002180
MLO80100-00046	MAVC-010000-000046
MLO80100-00080T	MAVC-010000-000080
MLO80100-00095	MAVC-010000-000095
MLO80100-00140	MAVC-010000-000140
MLO80100-00211	MAVC-010000-000211
MLO80100-01020	MAVC-010000-001020
MLO80166-00687	MAVC-010000-000687
MLO80167-00732	MAVC-010000-000732
MLO81100-01960	MAVC-010000-001960
MLO81100-02040H	MAVC-010000-002040
MLO81159-01730	MAVC-010000-001730
MLO81169-02140	MAVC-010000-002140

Material Declaration for Typical LSM6 Synthesizer

Description	Weight (g)	Qty	Total Weight (g)	Composite material	Weight %	CAS Number
Amplifier	0.0380	1	0.038	Gallium Arsenide	2.5%	1303-00-0
				Gold	0.6%	7440-57-5
				Copper	37.4%	7440-50-8
				Ablebond 84-1 LMISR4	1.3%	7440-22-4
				Sumitomo 6710S	54.5%	60676-86-0
				Tin	3.7%	7440-31-5
				Ag	0.1%	7439-92-1
Capacitor, 0402	0.0005	21	0.011	BaTiO3	89.5%	12047-27-7
				Nickel	8.0%	7440-02-0
				Copper	1.8%	7440-50-8
				Tin	0.7%	7440-31-5
Capacitor, 0603	0.0380	2	0.076	BaTiO3	89.5%	12047-27-7
				Nickel	8.0%	7440-02-0
				Copper	1.8%	7440-50-8
				Tin	0.7%	7440-31-5
Capacitor, 1206	0.0076	1	0.008	BaTiO3	89.5%	12047-27-7
				Nickel	8.0%	7440-02-0
				Copper	1.8%	7440-50-8
				Tin	0.7%	7440-31-5
Diode, varactor	0.0046	1	0.005	Silicon	1.0%	7440-21-3
				Gold	1.0%	7440-57-5
				Copper	25.0%	7440-50-8
				Iron	1.0%	7439-89-6
				EP	20.0%	129915-35-1
				Silicon Dioxide	50.0%	7631-86-9
				Tin	2.0%	7440-31-5
PLL IC	0.0005	1	0.001	Aluminium Oxide	90.0%	1344-28-1
				Silicon Dioxide	2.5%	7631-86-9
				Silver	2.5%	7440-22-4
				Palladium	0.3%	03/05/7440
				Nickel	2.0%	7440-02-0
				Tin	2.8%	7440-31-5
Inductor, 0402	0.0005	7	0.004	Aluminium Oxide	90.0%	1344-28-1
				Nickel	5.0%	7440-02-0
				Copper	3.0%	7440-50-8
				Tin	2.0%	7440-31-5
Inductor, 0603	0.0038	1	0.004	Aluminium Oxide	90.0%	1344-28-1
				Nickel	5.0%	7440-02-0
				Tin	5.0%	7440-31-5
Inductor, air coil	0.0030	1	0.003	Copper	100.0%	7440-50-8

Material Declaration for Typical LSM6 Synthesizer (con't)

Description	Weight (g)	Qty	Total Weight (g)	Composite material	Weight %	CAS Number
Cover	0.8940	1	0.894	Copper	66.5%	7440-50-8
				Iron	0.1%	7439-89-6
				Zinc	28.5%	7440-66-6
				Nickel	5.0%	7440-02-0
PCB	1.0690	1	1.069	Glass cloth	55.0%	65997-17-3
				Copper	15.0%	7440-50-8
				Epoxy	20.0%	129915-35-1
				Barium sulphate	1.5%	7727-43-7
				2-(2-Ethoxyethoxy)ethyl acetate	2.0%	112-15-2
				Naphtha	1.5%	8030-30-6
				Nickel	4.5%	7440-02-0
				Gold	0.5%	7440-57-5
Resistor, 0402	0.0090	18	0.162	Aluminium Oxide	90.0%	1344-28-1
				Silicon Dioxide	2.5%	7631-86-9
				Silver	2.5%	7440-22-4
				Palladium	0.3%	7440-05-3
				Nickel	2.0%	7440-02-0
				Tin	2.8%	7440-31-5
Transistor	0.0025	1	0.003	Silicon	1.0%	7440-21-3
				Gold	1.0%	7440-57-5
				Copper	25.0%	7440-50-8
				Iron	1.0%	7439-89-6
				EP	20.0%	129915-35-1
				Silicon Dioxide	50.0%	7631-86-9
				Tin	2.0%	7440-31-5
Solder	0.0310	1	0.031	Tin	95.5%	7440-31-5
				Silver	4.0%	7440-22-4
				Copper	0.5%	7440-50-8

Total Weight (g) 2.306

The table includes materials defined in Article 4.1 of the European Directive 2002/95/EC on the reduction of the use of certain hazardous substances in electrical and electronic equipment (*RoHS Directive*).