

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Remove vendor CAGE 13919. Add vendor CAGE 69210. Add case outline Y. Changed to reflect MIL-H-38534 processing. Update document with editorial changes throughout.	93-03-29	K. A. Cottongim
B	Add vendor CAGE 51651, case outlines U and Z, and device type 02. Make corrections to table I.	95-02-08	K. A. Cottongim
C	Figure 1, case outline U, correct dimension A min. from 0.255" to 0.200". Figure 1, case outline U, correct dimension D min. from 1.350" to 1.035". Figure 1, case outline Y, change dimension C max. from .260" to .265". Figure 1, case outline Z, add dimension L, which was omitted. Table I, I _{OP} , subgroups 5 and 6, add note 2. Update drawing boilerplate to most current format.	02-05-21	Raymond Monnin

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

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REV STATUS OF SHEETS	REV	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13						
PMIC N/A	PREPARED BY Steve L. Duncan	<p align="center">DEFENSE SUPPLY CENTER COLUMBUS POST OFFICE BOX 3990 COLUMBUS, OHIO 43216-5000 http://www.dscc.dla.mil</p> <p align="center">MICROCIRCUIT, HYBRID, LINEAR, HIGH CURRENT, OPERATIONAL AMPLIFIER</p>																		
<p align="center">STANDARD MICROCIRCUIT DRAWING</p> <p align="center">THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE</p> <p align="center">AMSC N/A</p>	CHECKED BY Donald R. Osborne																			
	APPROVED BY William K. Heckman																			
	DRAWING APPROVAL DATE 89-10-16																			
REVISION LEVEL C	SIZE A	CAGE CODE 67268	5962-88701																	
	SHEET		1 OF 13																	

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-883 - Test Method Standard Microcircuits.
 MIL-STD-1835 - Interface Standard for Microcircuit Case Outlines.

HANDBOOKS

DEPARTMENT OF DEFENSE

MIL-HDBK-103 - List of Standard Microcircuit Drawings (SMD's).
 MIL-HDBK-780 - Standard Microcircuit Drawings.

(Unless otherwise indicated, copies of the specification, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Item requirements. The individual item performance requirements for device class H shall be in accordance with MIL-PRF-38534. Compliance with MIL-PRF-38534 may include the performance of all tests herein or as designated in the device manufacturer's Quality Management (QM) plan or as designated for the applicable device class. Therefore, the tests and inspections herein may not be performed for the applicable device class (see MIL-PRF-38534). Furthermore, the manufacturers may take exceptions or use alternate methods to the tests and inspections herein and not perform them. However, the performance requirements as defined in MIL-PRF-38534 shall be met for the applicable device class.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38534 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full specified operating temperature range.

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3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are defined in table I.

3.5 Marking of device(s). Marking of device(s) shall be in accordance with MIL-PRF-38534. The device shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's vendor similar PIN may also be marked in MIL-HDBK-103 and QML-38534.

3.6 Data. In addition to the general performance requirements of MIL-PRF-38534, the manufacturer of the device described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, for each device type listed herein. Also, the data should include a summary of all parameters manually tested, and for those which, if any, are guaranteed. This data shall be maintained under document revision level control by the manufacturer and be made available to the preparing activity (DSCC-VA) upon request.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to supply to this drawing. The certificate of compliance (original copy) submitted to DSCC-VA shall affirm that the manufacturer's product meets the performance requirements of MIL-PRF-38534 and herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38534 shall be provided with each lot of microcircuits delivered to this drawing.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38534 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534. The following additional criteria shall apply:

- a. Pre-seal burn-in test, method 1030 of MIL-STD-883. (optional for class H)
 - (1) Test condition C or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1030 of MIL-STD-883.
 - (2) T_A as specified in accordance with table I of method 1015 of MIL-STD-883.
- b. Burn-in test, method 1015 of MIL-STD-883.
 - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.
 - (2) T_A as specified in accordance with table I of method 1015 of MIL-STD-883.
- c. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _A ≤ +125°C ±V _{CC} = ±34 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Input offset voltage	V _{IO}	T _A = +25°C	1	All	-1	+1	mV
Input offset voltage drift	$\frac{\Delta V_{IO}}{\Delta T}$	T _A = -55°C and +125°C	2,3	All	-30	+30	μV/°C
Input bias current	±I _B		1	All	-50	+50	pA
			2,3		-50	+50	nA
Input offset current	I _{OS}		1	All	-30	+30	pA
			2,3		-20	+20	nA
Power supply rejection ratio	+PSRR	-V _{CC} = -34V dc, +V _{CC} = +10 V to +40 V dc	1	All	-10	+10	μV/V
			2,3		-20	+20	
	-PSRR	+V _{CC} = +34V dc, -V _{CC} = -10 V to -40 V dc	1	All	-10	+10	μV/V
			2,3		-20	+20	
Common mode rejection ratio	CMRR	V _{CM} = ±22 V dc, f = dc	1	All	95		dB
			2,3		90		
Supply currents	±I _{CC}	V _{CM} = 0 V, no load condition	1,2,3	All	-30	+30	mA
Output voltage peak	V _{OP}	I _O = 5 A peak, R _L = 5.6Ω, 10 kHz sine wave, T _A = +25°C	4	All	±28.0		V
		R _L = 10Ω, 10 kHz sine wave, T _A = -55°C and +125°C	5,6		±30		

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

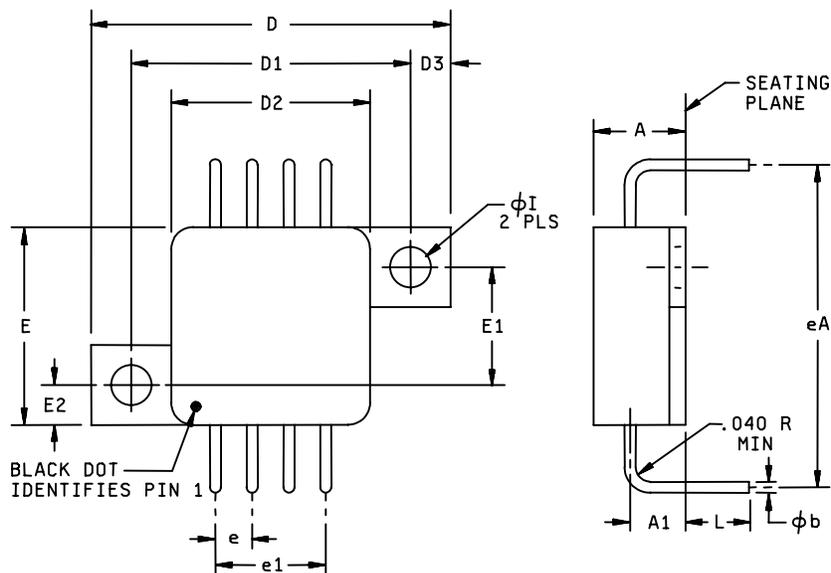
Test	Symbol	Conditions -55°C ≤ T _A ≤ +125°C ±V _{CC} = ±34 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output current peak	I _{OP}	R _L = 5.6Ω, V _{OUT} = ±28 V, T _A = +25°C <u>1/</u>	4	All	±5		A
		R _L = 10Ω, V _{OUT} = ±30 V T _A = -55°C and +125°C <u>1/ 2/</u>	5,6		±3		
Voltage gain	A _{VS}	R _L = 10 kΩ	4	All	95		dB
			5,6		86		
Slew rate	±SR	R _L = 10.0Ω, T _A = +25°C	7	All	±6		V/μs

1/ Internal current limit circuitry is controlled by a single external resistor, R_{CL}. To calculate the value of the current limit resistor, use R_{CL} = (0.809/I_{LIM}) - 0.057, where I_{LIM} is equal to the desired output current (I_{OP}).

2/ Test can be performed using R_L = 10 kΩ with a minimum limit of ±3 mA.

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Case outline U.



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	5.08	6.73	0.200	0.265
A1	3.68	3.94	0.145	0.155
ϕb	0.71	0.81	0.028	0.032
D	26.16	26.54	1.035	1.045
D1	19.93	20.19	0.785	0.795
D2	13.59	13.84	0.535	0.545
D3	3.05	3.30	0.120	0.130
E	13.59	13.84	0.535	0.545
E1	7.24	7.49	0.285	0.295
E2	3.05	3.30	0.120	0.130
e	1.41	2.67	0.095	0.105
e1	7.49	7.75	0.295	0.305
eA	22.73	22.49	0.895	0.905
ϕI	3.05	3.30	0.120	0.130
L	4.57	10.67	0.180	0.420

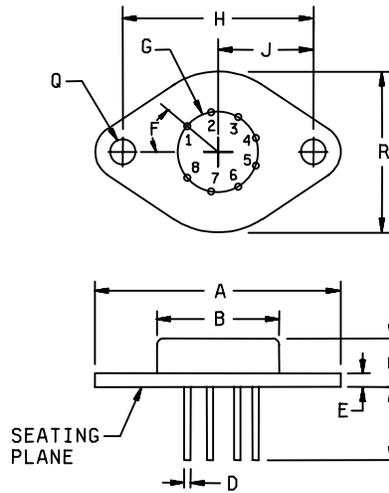
NOTES:

1. The U. S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.

FIGURE 1. Case outline(s).

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Case outline X.



Symbol	Inches		Millimeters	
	Min	Max	Min	Max
A	1.510	1.550	38.35	39.37
B	.745	.770	18.92	19.56
C	.260	.340	6.60	8.64
D	.038	.042	0.97	1.07
E	.080	.105	2.03	2.67
F	40° BSC		40° BSC	
G	.500 BSC		12.7 BSC	
H	1.186 BSC		30.12 BSC	
J	.593 BSC		15.06 BSC	
K	.400	.500	10.16	12.70
Q	.151	.161	3.84	4.09
R	.980	1.020	24.89	25.91

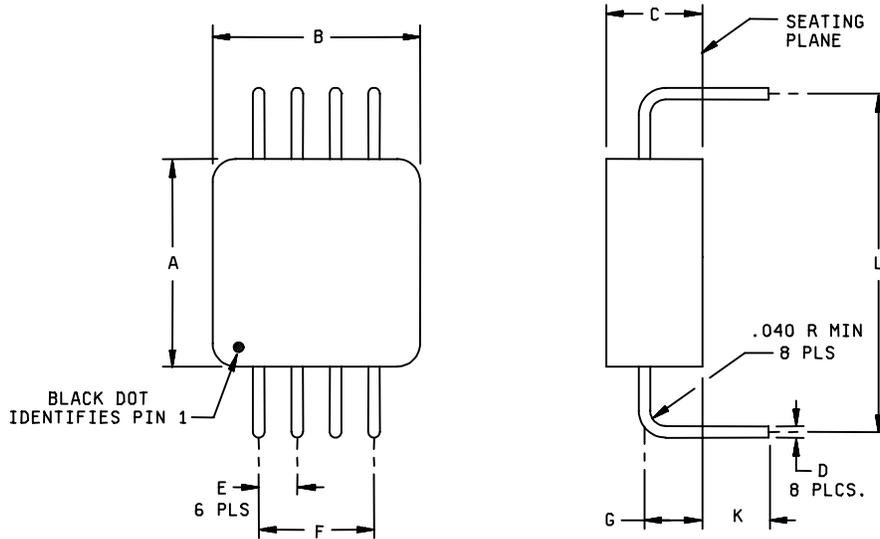
NOTES:

1. The U. S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Pin numbers are for reference and may not be marked on package.

FIGURE 1. Case outline(s)- -Continued.

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Case outline Y.



Symbol	Inches		Millimeters	
	Min	Max	Min	Max
A	.535	.545	13.59	13.84
B	.535	.545	13.59	13.84
C	.200	.265	5.08	6.73
D	.028	.032	0.71	0.81
E	.095	.105	2.41	2.67
F	.295	.305	7.49	7.75
G	.145	.155	3.68	3.94
K	.180	.420	4.57	10.67
L	.885	.915	22.48	23.24
R	.040		1.02	

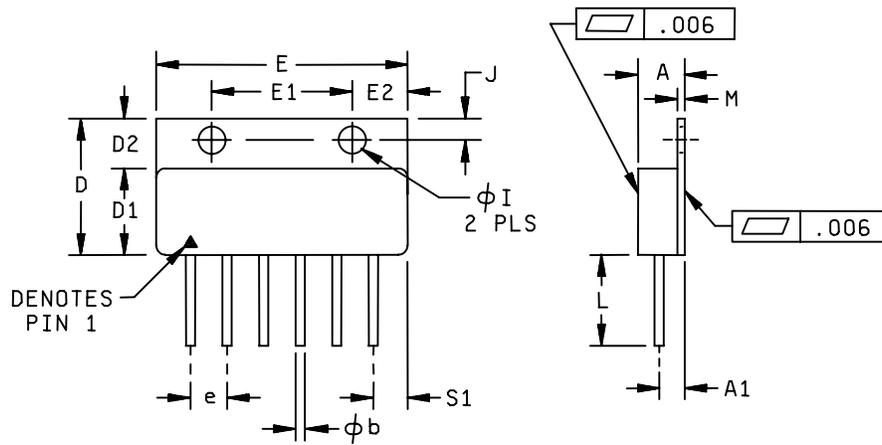
NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Leads in true position within 0.01 inch (0.25 mm)R at MMC at seating plane.
2. Pin numbers shown are for reference only. Numbers may not be marked on package.

FIGURE 1. Case outline(s)- Continued.

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Case outline Z.



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A		6.48		0.255
A1	3.43	3.68	0.135	0.145
Øb	1.47	1.57	0.058	0.062
D	18.80	19.30	0.740	0.760
D1	11.94	12.19	0.470	0.480
D2	6.86	7.11	0.270	0.280
E	34.67	35.18	1.365	1.385
E1	19.43	19.68	0.765	0.775
E2	7.44	9.40	0.293	0.307
e	4.95	5.21	0.195	0.205
ØI	3.68	3.94	0.145	0.155
J	2.87	3.12	0.113	0.123
M	0.96	1.07	0.038	0.042
S1	4.65	4.90	0.183	0.193
L	12.70		0.500	

NOTES:

1. The U. S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.

FIGURE 1. Case outline(s) - Continued.

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Device types	01 and 02	01	01
Case outlines	X	U and Y	Z
Terminal number	Terminal symbol	Terminal symbol	Terminal symbol
1	Current sense	-V _{CC}	-V _{CC}
2	No connection	No connection	Output drive
3	+V _{CC}	Output drive	Current sense
4	+IN	Current sense	+V _{CC}
5	-IN	+V _{CC}	+IN
6	-V _{CC}	No connection	-IN
7	No connection	+IN	---
8	Output drive	-IN	---

FIGURE 2. Terminal connections.

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TABLE II. Electrical test requirements.

MIL-PRF-38534 test requirements	Subgroups (in accordance with MIL-PRF-38534, group A test table)
Interim electrical parameters	1
Final electrical parameters	1*, 2, 3, 4, 5, 6, 7
Group A test requirements	1, 2, 3, 4, 5, 6, 7
Group C end-point electrical parameters	1

* PDA applies to subgroup 1.

4.3 Conformance and periodic inspections. Conformance inspection (CI) and periodic inspection (PI) shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection (CI). Group A inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. Tests shall be as specified in table II herein.
- b. Subgroups 8, 9, 10, and 11 shall be omitted.

4.3.2 Group B inspection (PI). Group B inspection shall be in accordance with MIL-PRF-38534.

4.3.3 Group C inspection (PI). Group C inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test, method 1005 of MIL-STD-883.
 - (1) Test condition B or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.
 - (2) T_A as specified in accordance with table I of method 1005 of MIL-STD-883.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.3.4 Group D inspection (PI). Group D inspection shall be in accordance with MIL-PRF-38534.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38534.

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6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-973 using DD Form 1692, Engineering Change Proposal.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus when a system application requires configuration control and the applicable SMD. DSCC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Post Office Box 3990, Columbus, Ohio 43216-5000, or telephone (614) 692-0536.

6.6 Sources of supply. Sources of supply are listed in MIL-HDBK-103 and QML-38534. The vendors listed in MIL-HDBK-103 and QML-38534 have submitted a certificate of compliance (see 3.7 herein) to DSCC-VA and have agreed to this drawing.

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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 02-05-21

Approved sources of supply for SMD 5962-88701 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38534 during the next revisions. MIL-HDBK-103 and QML-38534 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DSCC-VA. This bulletin is superseded by the next dated revisions of MIL-HDBK-103 and QML-38534.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-8870101UC 5962-8870101UA 5962-8870101UA	51651 51651 69210	MSK 147B MSK 147B OMA541SDZB
5962-8870101XC 5962-8870101XA 5962-8870101XA	51651 51651 69210	MSK 541B MSK 541B OMA541SKB
5962-8870101YC 5962-8870101YA 5962-8870101YA	51651 51651 69210	MSK 146B MSK 146B OMA541SDB
5962-8870101ZC 5962-8870101ZA	51651 51651	MSK 145B MSK 145B
5962-8870102XA	69210	OMA541SKCB

- 1/ The lead finish shown for each PIN, representing a hermetic package, is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the Vendor to determine availability.
- 2/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE
number

Vendor name
and address

51651

M. S. Kennedy Corporation
4707 Dey Road
Liverpool, NY 13088

69210

Omnirel Corporation
205 Crawford Street
Leominster, MA 01453-2353

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