REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Changes in accordance with N.O.R. 5962-R074-93.	93-04-06	M. A. FRYE
B	Changes in accordance with N.O.R. 5962-R003-94.	94-01-03	M. A. FRYE
C	Drawing updated to reflect current requirements. -ro	01-04-11	R. MONNIN
D	Update drawing as part of 5 year review. -rrp	08-02-05	R. HEBER

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

REV																				
SHEET																				
REV																				
SHEET																				

REV STATUS	REV	D	D	D	D	D	D	D	D	D	D	D			
OF SHEETS	SHEET	1	2	3	4	5	6	7	8	9	10	11			

PMIC N/A

PREPARED BY
RICK C. OFFICER

STANDARD MICROCIRCUIT DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS

AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

CHECKED BY
CHARLES E. BESORE

APPROVED BY
MICHAEL A. FRYE

DRAWING APPROVAL DATE
92-07-16

REVISION LEVEL
D

DEFENSE SUPPLY CENTER COLUMBUS
COLUMBUS, OHIO 43218-3990
http://www.dscc.dla.mil

MICROCIRCUIT, LINEAR, WIDEBAND, HIGH OUTPUT CURRENT, FAST SETTLING, OPERATIONAL AMPLIFIER, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	**67268**	**5962-89642**

SHEET 1 OF 11

1. SCOPE

1.1 Scope. This drawing describes device requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A.

1.2 Part or Identifying Number (PIN). The complete PIN is as shown in the following example:

5962-89642	01	C	X
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish (see 1.2.3)

1.2.1 Device type(s). The device type(s) identify the circuit function as follows:

Device type	Generic number	Circuit function
01	AD842	Wideband, high output current, fast settling operational amplifier

1.2.2 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
X	See figure 1	12	Can
2	CQCC1-N20	20	Square leadless chip carrier

1.2.3 Lead finish. The lead finish is as specified in MIL-PRF-38535, appendix A.

1.3 Absolute maximum ratings. 1/ 2/

Voltage between $+V_S$ and $-V_S$ terminals ..... 36 V dc
Differential input voltage ..... ±6.0 V dc
Voltage at either input terminal ..... $+V_S$ and $-V_S$
Peak output current (< 10 % duty cycle) ..... 200 mA
Power dissipation (P_D):
  Case C ..... 1.3 W 3/
  Case X ..... 1.5 W 3/
  Case 2 ..... 1.0 W 3/
Junction temperature (T_J) ..... +175°C
Storage temperature range ..... -65°C to +150°C
Lead temperature (soldering, 10 seconds) ..... +300°C
Thermal resistance, junction-to-case (θ_{JC}):
  Cases C and X ..... 30°C/W
  Case 2 ..... 35°C/W
Thermal resistance, junction-to-case (θ_{JA}):
  Case C ..... 110°C/W
  Case X ..... 100°C/W
  Case 2 ..... 150°C/W

1/ Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

2/ Unless otherwise specified, T_A = +25°C.

3/ Derate linearly above T_A = +25°C for case C at 8.7mw/°C, case X at 10 mW/°C and case 2 at 6.7 mW/°C.

1.4 Recommended operating conditions.

Positive supply voltage range ($+V_S$) ..... +5 V dc to +15 V dc
Negative supply voltage range ($-V_S$) ..... -5 V dc to –15 V dc
Common mode input voltage (V_{CM}) ..... ±10 V dc
Load resistance (R_L) ..... 500 Ω
Ambient operating temperature range (T_A) ..... -55°C to +125°C

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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-38535 - Integrated Circuits, Manufacturing, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard Microcircuits.
MIL-STD-1835 - Interface Standard Electronic Component Case Outlines.

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103 - List of Standard Microcircuit Drawings.
MIL-HDBK-780 - Standard Microcircuit Drawings.

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or http://assist.daps.dla.mil or 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 requirements shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein. Product built to this drawing that is produced by a Qualified Manufacturer Listing (QML) certified and qualified manufacturer or a manufacturer who has been granted transitional certification to MIL-PRF-38535 may be processed as QML product in accordance with the manufacturers approved program plan and qualifying activity approval in accordance with MIL-PRF-38535. This QML flow as documented in the Quality Management (QM) plan may make modifications to the requirements herein. These modifications shall not affect form, fit, or function of the device. These modifications shall not affect the PIN as described herein. A "Q" or "QML" certification mark in accordance with MIL-PRF-38535 is required to identify when the QML flow option is used.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535, appendix A and herein.

3.2.1 Case outline. The case outline 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 ambient operating temperature range.

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

3.5 Marking. Marking shall be in accordance with MIL-PRF-38535, appendix A. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked. For packages where marking of the entire SMD PIN number is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device.

3.5.1 Certification/compliance mark. A compliance indicator “C” shall be marked on all non-JAN devices built in compliance to MIL-PRF-38535, appendix A. The compliance indicator “C” shall be replaced with a "Q" or "QML" certification mark in accordance with MIL-PRF-38535 to identify when the QML flow option is used.

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-HDBK-103 (see 6.6 herein). The certificate of compliance submitted to DSCC-VA prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38535, appendix A and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DSCC-VA shall be required for any change that affects this drawing.

3.9 Verification and review. DSCC, DSCC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. 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 the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1015 of MIL-STD-883.

(2) T_A = +125°C, minimum.

b. 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.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 5, 6, 7, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ $\pm V_S = \pm 15$ V unless otherwise specified	Group A subgroups	Device type	Limits 2/		Unit
					Min	Max	
Input offset voltage	V_{IO}	V_{CM} = 0 V	1	01	-1.5	+1.5	mV
			2,3		-3.5	+3.5	
Input bias current	$+I_B$	V_{CM} = 0 V	1	01		+8	µA
			2,3			+12	
	$-I_B$		1			+8	
			2,3			+12	
Input offset current	I_{IO}	V_{CM} = 0 V	1	01	-0.4	+0.4	µA
			2,3		-0.6	+0.6	
Common mode voltage range	$+V_{CM}$	$+V_S$ = 5.0 V, $-V_S$ = -25 V V_{OUT} = -10 V	1,2,3	01	10		V
	$-V_{CM}$	$+V_S$ = 25 V, $-V_S$ = -5 V V_{OUT} = 10 V				-10	
Large signal voltage gain	$+A_{VOL}$	V_{OUT} = 0 V and 10 V, R_L = 500 Ω	1	01	40		V/mV
			2,3		20		
	$-A_{VOL}$	V_{OUT} = 0 V and -10 V, R_L = 500 Ω	1		40		
			2,3		20		
Output current	$+I_{OUT}$	V_{OUT} = 0 V, T_A = +25°C	1	01	100		mA
	$-I_{OUT}$	V_{OUT} = 0 V, T_A = +25°C				-100	
Output voltage swing	$+V_{OUT}$	R_L = 500 Ω	1,2,3	01	10		V
	$-V_{OUT}$					-10	
Quiescent power supply current	$+I_{CC}$	V_{OUT} = 0 V, I_{OUT} = 0 mA	1	01		+14	mA
			2,3			+19	
	$-I_{CC}$		1		-14		
			2,3		-19		

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ $\pm V_S = \pm 15$ V unless otherwise specified	Group A subgroups	Device type	Limits 2/		Unit
					Min	Max	
Power supply rejection ratio	+PSRR	$+V_S$ = 5.0 V to 18 V,	1	01	86		dB
		$-V_S$ = -15 V	2,3		80		
	-PSRR	$-V_S$ = -5.0 V to –18 V	1		86		
		$+V_S$ = +15 V	2,3		80		
Quiescent power consumption 3/	P_C	V_{OUT} = 0 V, I_{OUT} = 0 mA	1	01		420	mW
			2,3			570	
Differential input resistance 4/	R_{IN}	V_{CM} = 0 V, T_A = +25°C	4	01	50		kΩ
Gain bandwidth product 4/	GBWP	$V_{OUT} = \pm 100$ mV, f_1 = 100 kHz, f_2 = 10 MHz, R_L = 500 Ω, T_A = +25°C	4	01	50		MHz
Full power bandwidth 4/ 5/	FPBW	V_{PK} = 10 V, R_L = 500 Ω, T_A = +25°C	4	01	4.7		MHz
Closed loop stable gain 4/	CLSG	R_L = 500 Ω, $C_L \le 10$ pF, T_A = +25°C	4	01	2		V/V
Common mode rejection ratio	+CMRR	ΔV_{CM} = 10 V, $+V_S$ = 5.0 V,	1	01	86		dB
		$-V_S$ = -25 V, V_{OUT} = -10 V	2,3		80		
	-CMRR	ΔV_{CM} = -10 V, $+V_S$ = 25 V,	1		86		
		$-V_S$ = -5 V, V_{OUT} = 10 V	2,3		80		
Settling time 4/	t_S	A_V = -2 V/V, R_L = 500 Ω, 10 V step at 0.1 % of the final value, T_A = +25°C	9	01		150	ns
		A_V = -2 V/V, R_L = 500 Ω, 10 V step at 0.01 % of the fixed value, T_A = +25°C				200	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ $\pm V_S = \pm 15$ V unless otherwise specified	Group A subgroups	Device type	Limits 2/		Unit
					Min	Max	
Overshoot 4/	+OS	V_{OUT} = 0 V to +200 mV, A_V = +2, R_L = 500 Ω, T_A = +25°C	9	01		50	%
	-OS	V_{OUT} = 0 V to -200 mV, A_V = +2, R_L = 500 Ω, T_A = +25°C				50	
Slew rate 4/	+SR	V_{OUT} = -5.0 V to 5.0 V, measured from 10 % to 90 % point, R_L = 500 Ω, A_V = -2 V/V, rising edge	9	01	300		V/μs
			10,11		200		
	-SR	V_{OUT} = 5.0 V to -5.0 V, measured from 90 % to 10 % point, R_L = 500 Ω, A_V = -2 V/V, falling edge	9		300		
			10,11		200		
Rise time 4/ 6/	t_R	V_{OUT} = 0 V to +200 mV, A_V = +2, R_L = 500 Ω	9,10,11	01		10	ns
Fall time 4/ 6/	t_F	V_{OUT} = 0 V to -200 mV, A_V = +2, R_L = 500 Ω	9,10,11	01		10	ns

1/ Unless otherwise specified, for dc tests, R_L = 100 Ω and V_{OUT} = 0 V.

2/ The algebraic convention, whereby the most negative value is a minimum and the most positive is a maximum, is used in this table. Negative current shall be defined as conventional current flow out of device terminal.

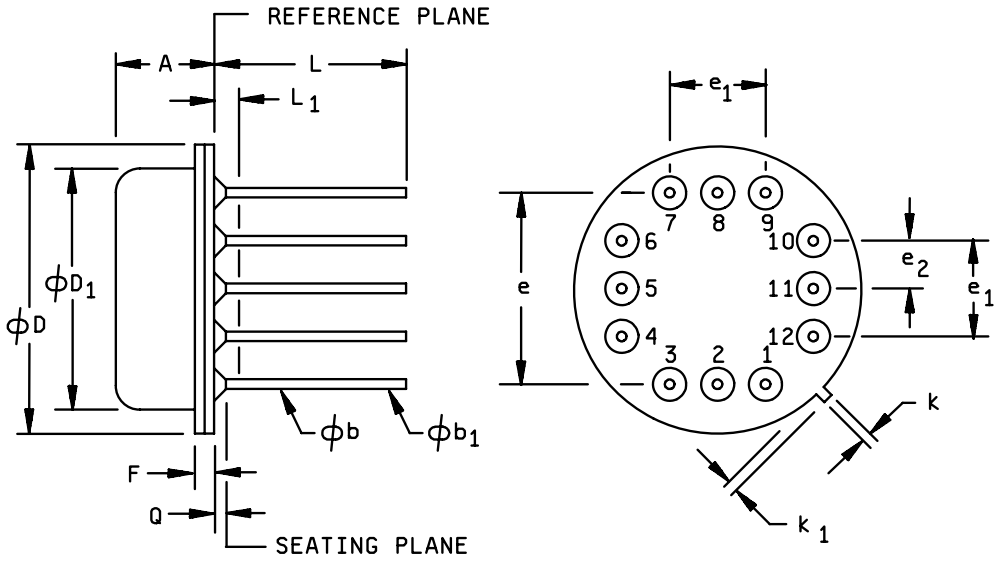
3/ Quiescent power consumption is based on quiescent supply current test maximum with no load on outputs.

4/ If not tested, shall be guaranteed to the limits specified in table I herein.

5/ Full power bandwidth = SR / (2π x V_{PK}).

6/ Rise and fall times measured between 10 percent and 90 percent point.

Case outline X



Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	.148	.181	3.76	4.60	
ϕb	.016	.019	0.41	0.48	1
ϕb1	.016	.021	0.41	0.53	1
ϕD	.592	.615	15.04	15.62	
ϕD1	.545	.555	13.84	14.10	
e	.400 BSC		10.16 BSC		3
e1	.200 BSC		5.00 BSC		3
e2	.100 BSC		2.54 BSC		3
F	---	.040	---	1.02	
k	.026	.036	0.66	0.91	
k1	.027	.037	0.68	0.94	2
L	.375	---	9.50	---	
L1	---	.050	---	1.27	1
Q	.010	.045	0.25	1.14	

NOTES:

1. All leads ϕb applies between L and L_1, ϕb1 applies between L_1 and 0.375 inch (9.50 mm) from the reference plane. Diameter is uncontrolled in L_1 and beyond 0.375 inch (9.50 mm) from the reference plane.
2. Measured from the maximum diameter of the product.
3. Leads having a maximum diameter 0.019 inch (0.48 mm) measured in gauging plane 0.054 inch (1.37 mm) + 0.001 inch (0.03 mm) - 0.000 inch (0.000 mm) below the base plane of the product are within 0.007 inch (0.18 mm) of their true position relative to the maximum width tab.

FIGURE 1. Case outline.

Device type	01		
Case outlines	C	X	2
Terminal number	Terminal symbol		
1	NC	NC	NC
2	NC	NC	BALANCE
3	BALANCE	BALANCE	NC
4	-INPUT	BALANCE	NC
5	+INPUT	-INPUT	-INPUT
6	$-V_S$	+INPUT	NC
7	NC	NC	+INPUT
8	NC	NC	NC
9	NC	NC	NC
10	OUTPUT	$-V_S$	$-V_S$
11	$+V_S$	OUTPUT	NC
12	NC	$+V_S$	NC
13	BALANCE	---	NC
14	NC	---	NC
15	---	---	OUTPUT
16	---	---	NC
17	---	---	$+V_S$
18	---	---	NC
19	---	---	NC
20	---	---	BALANCE

NC = No connection

FIGURE 2. Terminal connections.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (in accordance with MIL-STD-883, method 5005, table I)
Interim electrical parameters (method 5004)	1,4
Final electrical test parameters (method 5004)	1*,2,3,4
Group A test requirements (method 5005)	1,2,3,4,9**,10**,11**
Groups C and D end-point electrical parameters (method 5005)	1

* PDA applies to subgroup 1.
** Subgroups 9, 10, and 11, if not tested, shall be guaranteed to the limits specified in table I herein.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 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 the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1005 of MIL-STD-883.

(2) T_A = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535, appendix A.

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 using DD Form 1692, Engineering Change Proposal.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus (DSCC) 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 microelectronics devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-0547

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-HDBK-103. The vendors listed in MIL-HDBK-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DSCC-VA.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 08-02-05

Approved sources of supply for SMD 5962-89642 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38535 during the next revision. MIL-HDBK-103 and QML-38535 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 information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535. DSCC maintains an online database of all current sources of supply at http://www.dscc.dla.mil/Programs/Smcr/ .

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/
5962-8964201CA	24355	AD842SQ/883B
5962-8964201XA	24355	AD842SH/883B
5962-89642012A	24355	AD842SE/883B

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 its 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
24355	Analog Devices Route 1 Industrial Park P.O. Box 9106 Norwood, MA 02062 Point of contact: 804 Woburn Street Wilmington, MA 01887-3462

Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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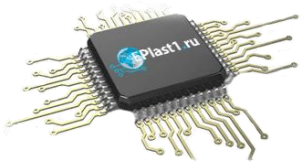
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.