

Pins & Receptacles

Pin & receptacle shells are manufactured by precision high-speed turning machines. The base materials for these components are copper alloys.

Receptacles are a two piece construction consisting of a plated contact press-fit into a plated shell. The contacts are stamped from beryllium copper strip.

Materials

Pins & Receptacle Shells:

Brass Alloy 360 UNS C36000 ASTM-B16

(Up to a .250" diameter)

Phosphor Bronze alloy 544 UNS C54400 ASTM-B139

(Up to a .072" diameter)

Tellurium Copper alloy 145 UNS C14500 ASTM-B301

(Up to a .156" diameters)

See page 154 and 203 for a complete list of standard available stock diameters.

(For the availability of larger diameter materials contact Technical Services).

Contacts:

Beryllium copper UNS C17200 ASTM-B194 (For most applications)

Beryllium Nickel UNS N03360 (For high temperature applications)

(For individual contact specifications see pages 250 - 262)
The materials listed above are all RoHS compliant.

Dimensional, Mechanical & Environmental Data

Standard tolerances for pins & receptacle shells:

Diameters +/- .002"

Lengths +/- .005"

Angles +/- 2°

Mechanical Life (Durability): Mill-Max receptacles are capable of 1,000 minimum insertion/extraction cycles for a broad range of applications. Mating pin size, shape and finish, along with application specific variables, will affect the life of a contact.

Contact Forces: See individual contact specifications on pages 250 - 262.

Environmental Data:

- Operating temperature range: -55/+125° C
- Vibration (No electrical discontinuity Greater than 1 µs): 10-2000 HZ, 15 G
- Shock (No electrical discontinuity Greater than 1 µs): 50 G

Electrical data is dependent on the contact used in the receptacle. See page 248 for free air current ratings of the contacts.

Platings

GOLD per ASTM B 488 and MIL-G-45204, Type 1, Code C

SILVER per ASTM B 700, Grade B, Class S

TIN per ASTM B 545, Type 1

TIN/LEAD (93/7) per ASTM B 545

ELECTRO-SOLDER (60/40) per ASTM B 579, Bright

NICKEL per SAE-AMS-QQ-N-290

ELECTROLESS NICKEL per MIL-C-26074

COPPER per SAE-AMS-2418

Connectors

Connectors are headers, sockets and interconnects. They consist of pins, receptacles or spring pins assembled into thermoplastics or machined laminate insulator bodies. They are available in DIP, SIP, strip, BGA and PGA packages in grids of 1mm, .050", .070", 2mm, .100", .8mm for BGA's and .100" interstitial for PGA's.

Electrical Data

SERIES:	100-700	80X	830	850
• Rated current (Amps):	3	3	3	1
• Rated voltage:	100 VRMS/150 VDC			
• Contact resistance:	10 mΩ max.			
• Insulation resistance:	10,000 MΩ min.			
• Dielectric strength:	1000 VRMS min. (700 VRMS min. for series 117 Shrink DIP)			
• Air and creepage distance (inch.):	.028 .033/.028 .020 .016/.020 (.012 for series 117 Shrink DIP)			
• Capacitance(pF max):	.8	1	1	1

Electrical data above does not apply to BGA, PLCC, USB or spring-loaded connectors. Electrical data for these products can be found on the following pages: BGA – Page 141; PLCC - Page 141; USB - Pages 147 - 150; Spring-Loaded connectors – Pages 6 - 19

Current ratings are for a 10° C temperature rise above ambient

Operating temperature range: -55/+125° C

General tolerances for assembled connector products:

- Lengths: +/- .010"
- Connector Flatness: .005" (up to 1" in length)
- Co-planarity of SMT Connectors: .005" (up to 1" in length)
- For connectors exceeding 1" in length the flatness/ co-planarity may exceed .005". Please contact Technical Services for more information.

(Note: Specifications and tolerances are provided wherever possible. Due to the wide variety of connectors Mill-Max offers, the specific tolerances vary from product to product. If you need information regarding the tolerance of a particular part, please contact Technical Services.)

Materials

Insulator Bodies:

Standard material is glass filled thermoplastic polyester (PCT), self extinguishing, rated UL 94 V-0.

Some surface mount, pin grid array, spring pin and shrouded connector insulators are molded from high temperature Nylon 46 or PPS, rated UL 94 V-0.

FR-4 epoxy laminate is a thermoset material used in custom insulators and high temperature applications. It is especially useful because of its low Temperature Coefficient of Expansion (TCE). See chart below:

TCE for molded insulator	30 ppm/° C
TCE for 4-Layer PCB	13 ppm/° C
TCE for unclad epoxy	12 ppm/° C

The above insulator materials are all suitable for lead free soldering processes up to 260° C.

For complete material properties of plastics used by Mill-Max see page 263.

For inquiries regarding other insulator materials, please contact Technical Services.

Spring Pins

Spring pins consist of precision-machined brass components assembled together with beryllium copper or stainless steel springs. External components and internal springs are gold-plated. Spring pins are designed to be used at mid-stroke. Over compression can cause damage restricting the movement of the plunger.

Materials

External Components (Body, Piston, Base, Tail):

Brass Alloy 360 UNS C36000 ASTM-B16

Springs

Beryllium copper UNS C17200 ASTM-B197

Stainless Steel 302

Dimensional, Mechanical & Environmental Data

Standard tolerances for spring pins at initial height:

Diameters +/- .002"

Lengths +/- .006"

Mechanical life (durability): Tested to 1,000,000 cycles

Force tolerance: +/- 20 g (See individual spring pin data on pages 6 - 19 for forces)

Stroke tolerance: +/- .005"

Environmental Data:

- Operating temperature range: -55/+125° C
- Vibration (No electrical discontinuity Greater than 1 µs): 0-200 HZ, 10 G
- Shock (No electrical discontinuity Greater than 1 µs): 50 G

For complete material properties of metals, platings and plastics used by Mill-Max see page 263.

Where applicable, Mill-Max products and procedures are designed to meet the following standards:

- MIL-STD 1916** - DOD preferred methods for acceptance of product
- MIL-STD 202G** - Test methods for electronic and electrical component parts
- MIL-STD 45662** - Calibration system requirements, or ISO 10012
- MIL-F-14072** - Finishes for ground based electronic equipment
- MIL-I-45208** - Inspection system requirements or equivalent
- MIL-S-83505** - General specification for sockets (lead, electronic components)
- MIL-DTL-83734** - General specification for DIP sockets

In the interest of improved design, quality and performance, Mill-Max reserves the right to make changes in its specifications without prior notice.



PROPERTIES OF METALS USED BY MILL-MAX

Copper alloy rod and wire for precision-machined pins, receptacles & solder terminals (**RoHS-2 directive 2011/65/EU, exemption 6c**) allows up to 4% lead as an alloy agent in copper. All Mill-Max pin materials are:

BRASS ALLOY 360 per ASTM B 16

PHOSPHOR BRONZE Alloy 544 (UNS C54400) per ASTM B 139

TELLURIUM COPPER Alloy 145 (UNS C14500) per ASTM B 301

Spring alloy strip for stamping "multi-finger" spring contacts

BERYLLIUM COPPER Alloy 172 (UNS C17200) per ASTM B 194

BERYLLIUM NICKEL Alloy 360 (UNS N03360)

Properties of BRASS:

Stock diameters available: .062/.072/.078/.093/.125/.156/.187/.250"

Chemical composition: Cu 61.5%, Zn 35.4%, Pb 3.1%

Temper as machined: H02/H04

Modulus of elasticity: 14 MPsi

Tensile strength: 70-90 KSI

Hardness as machined: 80-90 Rockwell B

After machining, brass parts are often annealed (softened) for subsequent bending, swaging or crimping. A partial anneal down to 60±10 RB is recommended for 90° bends, a full anneal down to 35±15 RB is recommended for pins or terminals that are swaged (riveted) to a circuit board or crimped to a wire.

Density: .307 lbs/in³

Electrical conductivity: 26% IACS *

Melting point: 900°C/885°C (liquidus/solidus)

Properties of PHOSPHOR BRONZE:

Used for pins requiring more durability than brass.

Stock diameters available: .072/.078"

Chemical composition: Cu 88%, Sn 4%, Zn 4%, Pb 4%

Temper as machined: H04

Modulus of elasticity: 15 MPsi

Tensile strength: 70-80 KSI

Hardness as machined: 83 Rockwell B

Density: .321 lbs/in³

Electrical conductivity: 19% IACS *

Melting point: 1000°C/930°C (liquidus/solidus)

Properties of TELLURIUM COPPER:

Used for pins requiring a higher current carrying capacity than brass or phosphor bronze.

Stock diameters available: .079/.093/.125/.156"

Chemical composition: Cu 99.44%, Te .55%, P .008%

Temper as machined: H02

Modulus of elasticity: 17 MPsi

Tensile strength: 43 KSI

Hardness as machined: 43 Rockwell B

Density: .323 lbs/in³

Electrical conductivity: 93% IACS *

Thermal conductivity: 91% IACS *

Melting point: 1075°C/1051°C (liquidus/solidus)

Properties of BERYLLIUM COPPER:

Chemical composition: Cu 98.1%, Be 1.9%

Temper as stamped: TD01

Properties after heat treatment (TH01):

Modulus of Elasticity: 19 MPsi

Tensile Strength: 175-205 KSI

Yield Strength (0.2% offset): 150-185 KSI

Elongation: 3-10%

Stress Relaxation†: 96% of stress remains after 1,000 hours @ 100 °C
70% of stress remains after 1,000 hours @ 200 °C

Hardness: 36-43 Rockwell C

Density: .298 lbs/in³

Electrical Conductivity: 22% IACS *

Melting point: 980°C/865°C (liquidus/solidus)

Since BeCu loses its spring properties over time at high temperatures, it is rated for continuous use up to 150°C. For "down-hole" and "burn-in" applications up to 300°C. Mill-Max offers nine contacts (#19, #24, #25, #26, #27, #33, #38, #56, #58) made from Beryllium Nickel Alloy 360 (UNS N03360)

Properties of BERYLLIUM NICKEL:

Chemical composition: Ni 97.6%, Be 1.9%, Ti 0.5%

Modulus of Elasticity: 27-30 MPsi

Tensile Strength: 245 KSI min.

Yield Strength (0.2% offset): 200 KSI min.

Elongation: 9% min.

Hardness: 49 Rockwell C

Density: .294 lbs/in³

Electrical Conductivity: 7% IACS *

Melting point: 1,325°C/1,195°C (liquidus/solidus)

* International Annealed Copper Standard, i.e.: as a % of pure copper.

PROPERTIES OF PLASTICS USED BY MILL-MAX

Standard plastics used for catalog products:

Injection Molded

PCT Polyester, High Temp (Thermx CG933, black)

Nylon46, High Temp (Stanyl TE250F6 {30% glass} or TE250F9 {45% glass}, black)

PPS, High Temp (Ryton R-4-200)

Machined

FR-4 Epoxy/Glass Laminate. In stock thicknesses available: .010", .020", .031", .047", .062", .093", .125" (natural color, beige). Other thicknesses available upon request.

G-30 Polyimide/Glass Laminate, .062" thick (natural color, brown)

TEMPERATURE COMPARISON OF MOLDED INSULATORS

MATERIAL	BRAND	GRADE	HEAT DEFLECTION TEMP. (per ASTM D 648)
PCT Polyester	Thermx	CG-933	529°F (276°C) @ 66 psi
Nylon 46	Stanyl	TE250-F6 or F9	554°F (290°C) @ 264 psi
PPS	Ryton	R-4-200	>500°F (>260°C) @ 264 psi

Note: Materials with HDT above 446°F (230°C) are considered suitable for "eutectic" reflow soldering. For "lead-free" reflow soldering, choose materials with an HDT above 500°F (260°C).

PCT is the standard plastic used with RoHS "lead-free" plated pins.

MILL-MAX STANDARD PLATINGS (FINISHES):

GOLD per ASTM B 488, Type 1 (99.7% min. gold),
Code C (130-200 HK {Knoop hardness}),
Class (thickness) per customer's requirements

SILVER per ASTM B 700, Type 1 (99.9% min. silver),
Grade B (Bright),
Class S (anti-tarnish treatment),
Thickness (7.5µm/300µ" used for solder terminals)

TIN/LEAD (93/7) per ASTM B 545 (Appendix X6.3.2.5 to eliminate whisker growth)
Class A (2.5µm/100µ")
or Class B (5µm/200µ"),
Bright finish (Matte available to order)

ELECTRO-SOLDER (60/40) per ASTM B 579, SC2 (8µm/300µ"),
Bright finish (Matte available to order)

Standard finishes available for RoHS "lead-free" applications:

GOLD per ASTM B 488, Type 1 (99.7% min. gold),
Code C (130-200 HK {Knoop hardness}),
Class (thickness) per customer's requirements

TIN (100%) per ASTM B 545, Class A (2.5µm/100µ") or
Class B (5µm/200µ"),

Matte finish (With whisker and oxide inhibitors & a nickel underplate)

ALL MILL-MAX PARTS REQUIRE AN UNDERPLATE:

Brass parts need a barrier plate to prevent zinc diffusion, 50µ" min. nickel or 100µ" min. copper is recommended by ASTM B 545 and 579. ASTM B 488 also recommends a 50µ" min. nickel barrier plate beneath gold to prevent copper diffusion inherent with all copper alloy products.

MILL-MAX STANDARD UNDERPLATES:

NICKEL per ASTM B 689, Type 2 (Bright),
Class 1.25 (1.25µm/50µ") or Class 2.5 (2.5µm/100µ")

Also available for military and "non-magnetic" applications:

COPPER per ASTM B 734, Class 2.5 (2.5µm/100µ") or
Class 5 (5µm/200µ")



Annealing - Refers to a brass pin that has been softened by heat treatment which makes the pin easier to crimp, rivet (swage) or bend.

Carrier - An assembly consisting of an insulator with male pins onto which receptacles are loaded. This assembly is employed as a fixture during the soldering operation and is then removed leaving a PC board populated with individual receptacles. Female carriers that load male pins are also available for special applications.

Clip - See Contact.

Closed Entry - Refers to female contacts where the front rim prevents the insertion of an oversize pin that would otherwise damage the contact.

Compliance - Contact's ability to accept multiple insertions and extractions of a wide range of pin shapes and sizes while retaining its original configuration.

Compliant Press Fit - Method of mounting an interconnect component to a PC board where a drilled and slotted receptacle or pin is pressed into a plated-through-hole without damaging the hole.

Constant Usage Temperature (CUT) - Constant Usage Temperature is a measure of the maximum temperature that a material may be exposed to for long periods of time, 1000 - 1500 hrs., before degradation of its electrical and mechanical properties occurs.

Contact (and Contact Clip) - Multi-finger spring insert of a receptacle which completes the electrical path between a male pin and a female receptacle. Also referred to as a clip.

Contact Rating - Current carrying capability of a contact measured in amperes with respect to temperature rise above ambient.

Contact Resistance - The electrical resistance at the point of connection determined by the contact geometry, area of contact, plating and normal force.

Coplanarity - Refers to the measurement of multiple points and their distance from a respective plane. This is particularly useful for surface mount parts to determine the maximum amount of difference in the height of the surfaces that need to be soldered.

Electroplating - The electrodeposition of a metal coating on a conductive object such as a pin, shell, or contact clip.

Electro-vibratory Plating - An electroplating system where the parts are processed in a vibrating basket which ensures uniform plating thickness and avoids damage to delicate parts.

End Stackable - The ability for connectors to be mounted end to end while maintaining grid or spacing.

Extraction Force (or Withdrawal Force) - The force required to remove a lead from a contact.

Epoxy - Woven glass cloth epoxy laminate. Classified as a thermoset, the woven fibers of these materials enable them to withstand high temperatures without being damaged. Cut from large sheets of material, the insulator is then machined on a high speed drill/router the same way as printed circuit boards are fabricated.

Electrostatic Discharge (ESD) - The momentary electric current that flows between two objects that may cause damage to electronic equipment.

Flash (Plating) - A very thin plating of metal, usually less than 10 micro inches, to uniformly cover the surface of the base metal.

Flatness - Sometimes used in place of coplanarity, flatness refers to the amount of variation of a plane or surface.

Floating Contact - In surface mount sockets, a receptacle designed to move up and down freely in an insulator to compensate for unevenly dispensed solder paste.

Free Machining Alloy - An alloy which is easy to machine, e.g. brass alloy 360.

Fretting - A form of corrosion caused by vibration.

Gas Tight Connection - An electrical connection of sufficient pressure to prevent the intrusion of a corrosive atmosphere into the contact area.

Heat Deflection Temperature (HDT) - An industry recognized test for comparing the short term effects of high temperature on plastics.

Heat Treating - The process of using specific heating and cooling cycles to alter the mechanical properties of an alloy. Generally, heat treating can harden or soften a metal depending on the material, the parameters used and the desired physical property.

Hex Press Fit - A method of press-fitting either a pin or receptacle, using a hexagonal cross section, into a plated through-hole without causing damage to the hole while still maintaining a gas tight seal.

High Speed Turning - See Precision-Machined.

Injection Molding - A method of molding plastics by first heating granular plastic to its molten state and injecting it into the mold cavity where the plastic solidifies and is then ejected from the cavity.

Insertion Force - The force required to insert a male lead into a female socket.

Knurl - A vertical serration machined around the diameter of an interconnect pin providing a retention feature for press-fitting in a PC board or insulator and also preventing rotation of the pin.

LCP (Liquid Crystal Polymer) - Classified as a thermoplastic, LCP is a hard, rigid material which exhibits outstanding strength at high temperatures and exceptional strength and toughness in its thin walls. Applications: LCP is used as an insulator material for tight grid (.050", 2mm) connectors and extremely high temperature requirements.

Mating Pin - The pin used to interconnect two electronic devices by inserting it into the contact. Critical features are diameter, length, and shape (but not limited to.)

Machined - See Precision-Machined.

Migration - For a brass part plated with tin or gold, the migration of zinc from brass to the surface of the plating. This becomes zinc oxide and renders the part unsolderable. Zinc migration is prevented by using a copper or nickel underplate as a barrier.

Nylon 46 - Classified as thermoplastics. Nylon 46 offers superior heat resistance, good electrical properties and excellent toughness in its thin walls, which are desirable characteristics for connector insulators. Its superior strength in thin walls enables the press-fitting of pins in close proximity to each other without cracking or warping the material, making it ideal for molding 2mm and .050" grid insulators. Nylon 46 is suitable for high temperature applications including vapor phase, infra-red reflow and wave soldering operations.

Passive Device or Component - An electronic connector that consumes electrical energy, but does not produce electrical energy. Passive devices are not susceptible to significant ESD damage.

PCB - Printed Circuit Board.

PCT (Polycyclohexane Terephthalate) - Thermoplastic polyester is rated for higher temperatures. PCT is a standard material on DIP and SIP insulators for higher temperature operations. All PGA and surface mount products are molded from PCT and are suitable for infra-red, vapor phase and wave soldering.

Plating - A process in which metals (e.g. gold, tin-lead, nickel, silver) are electrically deposited onto a base metal in very thin and precise thicknesses.

Plated Through-Hole - A hole in a printed circuit board which has metallic walls connected to conductors on the surface or inside the board, in which the component lead is inserted and soldered.

Precision-Machined - Manufacturing process whereby a rapidly turning solid metal rod is cut to precise tolerances.

Receptacle - Female contact consisting of an outer shell & inner spring contact (clip) designed for multiple mating/unmating cycles with a male pin or component lead.

Screw-Machined - See Precision-Machined.

Secondary Machining - A process in which holes, slots, flats, squares or other special features may be machined onto a pin or receptacle after the basic shape of the part has been turned on a high speed lathe.

Shrink DIP Package - An IC which has a pin spacing of .070" on centers.

Skiving - The removal of a thin amount of plating when pins or contacts are press fit. For example, soft platings may yield some amount of skiving upon press fitting into an insulator or board. Skiving may also appear under a contact clip pressed into a receptacle shell.

Standoff - A protrusion at the bottom of the connector used to raise it off the PC board to aid in solder fillet formation, board inspection, flux removal and cleaning.

Swage Mount - A type of mounting commonly used with solder terminals and printed circuit pins where one end of the terminal is flared out (riveted) securing it to the PCB.

Thermal Coefficient of Expansion (TCE) - Expansion of material caused by an increase in temperature.

Thermoset - Type of plastic which is heat cured into a permanent shape and, due to chemical reaction, cannot be remelted.

Thermoplastics - Type of plastic which is molded under heat and pressure and can be remelted & reused many times.

Top Plate - Final surface plating over base metal and underplating.

Underplate - Plating between the base metal and the top plating.

Withdrawal Force (or Extraction Force) - The force required to remove a lead from a contact.

Wrapost (Terminal or Receptacle) - The length of square cross section of certain pins and receptacles which is used for making electrical connections via wire wrapping. Wire wrapping is a process in which wire is wrapped around the post to form a gas-tight connection without soldering.

DUAL-IN-LINE SOCKETS

DIP SOCKETS QUALIFIED TO MIL-DTL-83734

MIL SPEC #	MILL-MAX #	MIL SPEC #	MILL-MAX #	MIL SPEC #	MILL-MAX #
M83734/1-010	223-33-306-41-101000	M83734/7-010	223-33-628-41-101000	M83734/15-030	110-88-964-41-530000
M83734/1-011	223-83-306-41-101000	M83734/7-011	223-83-628-41-101000	M83734/15-031	210-33-964-41-101000
M83734/1-012	223-88-306-41-101000	M83734/7-012	223-88-628-41-101000	M83734/15-032	210-83-964-41-101000
M83734/1-025	210-33-306-41-101000	M83734/7-028	110-33-628-41-530000	M83734/15-033	210-88-964-41-101000
M83734/1-026	210-83-306-41-101000	M83734/7-029	110-83-628-41-530000		
M83734/1-027	210-88-306-41-101000	M83734/7-030	110-88-628-41-530000	M83734/17-001	221-33-632-41-101000
		M83734/7-031	210-33-628-41-101000	M83734/17-002	221-83-632-41-101000
M83734/2-010	223-33-308-41-101000	M83734/7-032	210-83-628-41-101000	M83734/17-003	221-88-632-41-101000
M83734/2-011	223-83-308-41-101000	M83734/7-033	210-88-628-41-101000	M83734/17-004	222-33-632-41-101000
M83734/2-012	223-88-308-41-101000			M83734/17-005	222-83-632-41-101000
M83734/2-028	110-33-308-41-530000	M83734/8-010	223-33-624-41-101000	M83734/17-006	222-88-632-41-101000
M83734/2-029	110-83-308-41-530000	M83734/8-011	223-83-624-41-101000	M83734/17-007	223-33-632-41-101000
M83734/2-030	110-88-308-41-530000	M83734/8-012	223-88-624-41-101000	M83734/17-008	223-83-632-41-101000
M83734/2-031	210-33-308-41-101000	M83734/8-028	110-33-624-41-530000	M83734/17-009	223-88-632-41-101000
M83734/2-032	210-83-308-41-101000	M83734/8-029	110-83-624-41-530000	M83734/17-013	210-33-632-41-101000
M83734/2-033	210-88-308-41-101000	M83734/8-030	110-88-624-41-530000	M83734/17-014	210-83-632-41-101000
		M83734/8-031	210-33-624-41-101000	M83734/17-015	210-88-632-41-101000
M83734/3-010	223-33-314-41-101000	M83734/8-032	210-83-624-41-101000		
M83734/3-011	223-83-314-41-101000	M83734/8-033	210-88-624-41-101000		
M83734/3-012	223-88-314-41-101000				
M83734/3-028	110-33-314-41-530000	M83734/9-010	223-33-636-41-101000		
M83734/3-029	110-83-314-41-530000	M83734/9-011	223-83-636-41-101000		
M83734/3-030	110-88-314-41-530000	M83734/9-012	223-88-636-41-101000		
M83734/3-031	210-33-314-41-101000	M83734/9-031	210-33-636-41-101000		
M83734/3-032	210-83-314-41-101000	M83734/9-032	210-83-636-41-101000		
M83734/3-033	210-88-314-41-101000	M83734/9-033	210-88-636-41-101000		
M83734/4-010	223-33-316-41-101000	M83734/10-010	223-33-640-41-101000		
M83734/4-011	223-83-316-41-101000	M83734/10-011	223-83-640-41-101000		
M83734/4-012	223-88-316-41-101000	M83734/10-012	223-88-640-41-101000		
M83734/4-028	110-33-316-41-530000	M83734/10-028	110-33-640-41-530000		
M83734/4-029	110-83-316-41-530000	M83734/10-029	110-83-640-41-530000		
M83734/4-030	110-88-316-41-530000	M83734/10-030	110-88-640-41-530000		
M83734/4-031	210-33-316-41-101000	M83734/10-031	210-33-640-41-101000		
M83734/4-032	210-83-316-41-101000	M83734/10-032	210-83-640-41-101000		
M83734/4-033	210-88-316-41-101000	M83734/10-033	210-88-640-41-101000		
M83734/5-010	223-33-318-41-101000	M83734/13-010	223-33-320-41-101000		
M83734/5-011	223-83-318-41-101000	M83734/13-011	223-83-320-41-101000		
M83734/5-012	223-88-318-41-101000	M83734/13-012	223-88-320-41-101000		
M83734/5-028	110-33-318-41-530000	M83734/13-028	110-33-320-41-530000		
M83734/5-029	110-83-318-41-530000	M83734/13-029	110-83-320-41-530000		
M83734/5-030	110-88-318-41-530000	M83734/13-030	110-88-320-41-530000		
M83734/5-031	210-33-318-41-101000	M83734/13-031	210-33-320-41-101000		
M83734/5-032	210-83-318-41-101000	M83734/13-032	210-83-320-41-101000		
M83734/5-033	210-88-318-41-101000	M83734/13-033	210-88-320-41-101000		
M83734/6-010	223-33-422-41-101000	M83734/14-028	110-33-648-41-530000		
M83734/6-011	223-83-422-41-101000	M83734/14-029	110-83-648-41-530000		
M83734/6-012	223-88-422-41-101000	M83734/14-030	110-88-648-41-530000		
M83734/6-028	110-33-422-41-530000				
M83734/6-029	110-83-422-41-530000	M83734/15-010	223-33-964-41-101000		
M83734/6-030	110-88-422-41-530000	M83734/15-011	223-83-964-41-101000		
M83734/6-031	210-33-422-41-101000	M83734/15-012	223-88-964-41-101000		
M83734/6-032	210-83-422-41-101000	M83734/15-028	110-33-964-41-530000		
M83734/6-033	210-88-422-41-101000	M83734/15-029	110-83-964-41-530000		



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101-93-XXX-41-56X000	1001/0156	95	160-XX-XXX-00-001000	0282	117
104-XX-XXX-41-770000	0477	96	162-XX-XXX-00-001000	1106-2	117
104-XX-XXX-41-780000	0478	96	162-XX-XXX-00-180000	6218	127
110-XX-210-10-001000	1001	134	162-XX-XXX-30-180000	6218	128
110-XX-210-10-002000	1001	135	163-XX-XXX-00-001000	1106-3	117
110-XX-3XX-10-001000	1001	134	170-XX-XXX-00-001000	0700	118
110-XX-3XX-10-002000	1001	135	173-XX-XXX-00-001000	0730-3	118
110-XX-3XX-10-003000	1001	135	180-XX-XXX-00-001000	8000	119
110-XX-3XX-10-004000	1001	135	182-XX-XXX-00-001000	8301-2	119
110-XX-3XX-10-005000	1001	135	183-XX-XXX-00-001000	8301-3	119
110-XX-XXX-41-001000	1001	90	210-XX-XXX-41-001000	1001	99
110-XX-XXX-41-105000	1005	104	210-XX-XXX-41-101000	1001	101
110-XX-XXX-41-530000	1001	100	210-XX-XXX-41-105000	1005	105
110-XX-XXX-41-605000	1005	94	210-XX-XXX-41-105799	1005	105
110-XX-XXX-41-801000	1001	98	214-XX-XXX-01-670799	1434	108
111-XX-XXX-41-001000	0134	91	214-XX-XXX-01-670800	1434	108
113-XX-XXX-41-117000	1334/1434	107	217-XX-764-41-005000	1802	125
114-XX-XXX-41-117000	1434	106	222-XX-XXX-41-001000	0089-2	99
115-XX-XXX-41-001000	0501	92	223-XX-XXX-41-001000	0088-3	99
115-XX-XXX-41-003000	1534	93	223-XX-XXX-41-101000	0038-3	102
116-XX-XXX-41-001000	0153-5	111	227-XX-764-41-002000	1702-2	125
116-XX-XXX-41-003000	0153-2	111	227-XX-764-41-003000	1703-3	125
116-XX-XXX-41-006000	0153-1	111	296-XX-010-30-691800	4077/4078	133
116-XX-XXX-41-007000	0153-3	111	296-XX-010-30-692800	4077/4078	133
116-XX-XXX-41-008000	0153-4	111	299-XX-XXX-10-001000	1103/0903	129
117-XX-XXX-41-005000	1802	125	299-XX-XXX-10-002000	1103/0904	129
117-XX-XXX-41-105000	1802	126	299-XX-XXX-11-001000	1103/1610	129
121-XX-XXX-41-001000	0040-1	109	299-XX-210-12-001800	1002-X	133
122-XX-XXX-41-001000	0089-2	109	301-43-1XX-41-560000	0156/1001	46
122-XX-XXX-41-801000	0089-2	98	304-XX-1XX-41-770000	0477	73
123-XX-XXX-41-001000	0088-3	109	304-XX-1XX-41-780000	0478	73
123-XX-XXX-41-801000	0088-3	98	310-XX-1XX-40-023000	1023	50
124-XX-XXX-41-002000	0086-4	109	310-XX-1XX-41-001000	1001	46,65
126-XX-XXX-41-001000	2601	110	310-XX-1XX-41-105000	1005	51
126-XX-XXX-41-002000	2602	110	310-XX-1XX-41-107000	1005	51
126-XX-XXX-41-003000	2603	110	311-XX-1XX-41-001000	0134	65
127-XX-XXX-41-002000	1702-2	125	315-XX-1XX-41-001000	0501	65
127-XX-XXX-41-003000	1703-3	125	315-XX-1XX-41-003000	1534	65
134-10-XXX-00-000000	3400	122	316-XX-1XX-41-001000	0153-5	67
134-10-XXX-00-010000	3401	122	316-XX-1XX-41-003000	0153-2	67
134-10-XXX-00-020000	3402	122	316-XX-1XX-41-006000	0153-1	67
134-10-XXX-00-050000	3405	122	316-XX-1XX-41-007000	0153-3	67
134-10-XXX-00-100000	3410	122	316-XX-1XX-41-008000	0153-4	67
142-XX-XXX-00-591000	4259-1	123	317-XX-121-41-005000	1802	125
142-XX-XXX-00-592000	4259-2	123	317-XX-121-41-105000	1802	126
142-XX-XXX-00-593000	4259-3	123	319-10-1XX-00-001000	1942	20
142-XX-XXX-00-594000	4259-4	123	319-10-1XX-00-002000	1940	20
146-XX-XXX-41-012000	4612	97	319-10-1XX-00-005000	1938	20
146-XX-XXX-41-013000	4613	97	319-XX-1XX-00-006000	1948	21.1
150-XX-XXX-00-001000	0290	116	319-10-1XX-30-041000	1941	20
150-10-XXX-00-106000	3404	124	321-13-1XX-41-001000	0040-1	69
151-10-XXX-00-003000	5503	120	322-XX-1XX-41-001000	0089-2	69
151-10-XXX-00-004000	5504	120	323-XX-1XX-41-001000	0088-3	69
151-10-XXX-00-005000	5505	120	324-XX-1XX-41-002000	0086-4	69
151-10-XXX-00-009000	5509	121	326-XX-1XX-41-001000	2601	71
151-10-XXX-00-010000	5510	121	326-XX-1XX-41-002000	2602	71
151-10-XXX-00-011000	5511	121	326-XX-1XX-41-003000	2603	71
153-XX-XXX-00-001000	5301	116	327-XX-121-41-002000	1702-2	125



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327-XX-121-41-003000	1703-3	125	415-XX-2XX-41-003000	1534	66
329-XX-1XX-41-540000	2954	48	416-XX-2XX-41-001000	0153-5	68
329-10-1XX-00-560000	2956-1	49	416-XX-2XX-41-003000	0153-2	68
330-10-1XX-00-240000	3024	20	416-XX-2XX-41-006000	0153-1	68
334-XX-1XX-00-000000	3400	81	416-XX-2XX-41-007000	0153-3	68
334-XX-1XX-00-010000	3401	81	416-XX-2XX-41-008000	0153-4	68
334-XX-1XX-00-020000	3402	81	419-10-2XX-00-001000	1942	21
334-XX-1XX-00-050000	3405	81	419-10-2XX-00-002000	1940	21
334-XX-1XX-00-100000	3410	81	419-10-2XX-00-005000	1938	21
335-XX-1XX-00-160000	3516	78	419-XX-2XX-00-006000	1948	21.2
339-XX-1XX-40-000000	3900	50.1	419-XX-2XX-30-007000	1947	21.2
340-XX-1XX-30-780100	4078	41,49	419-10-2XX-30-041000	1941	21
342-XX-1XX-00-591000	4259-1	82	421-XX-2XX-41-001000	0040-1	70
342-XX-1XX-00-592000	4259-2	82	422-XX-2XX-41-001000	0089-2	70
342-XX-1XX-00-593000	4259-3	82	423-XX-2XX-41-001000	0088-3	70
342-XX-1XX-00-594000	4259-4	82	424-XX-2XX-41-002000	0086-4	70
346-XX-1XX-41-012000	4612	73	426-XX-2XX-41-001000	2601	72
346-XX-1XX-41-013000	4613	73	426-XX-2XX-41-002000	2602	72
349-10-1XX-00-560000	4956-1	59	426-XX-2XX-41-003000	2603	72
350-XX-1XX-00-001000	0290	52,84	429-XX-2XX-41-540000	2954	48
350-XX-1XX-00-006000	3404	46	429-10-2XX-00-560000	2956-0	49
350-XX-1XX-00-106000	3404	51	430-10-2XX-00-240000	3024	21
350-XX-1XX-00-107000	3404	51	435-XX-2XX-00-160000	3516	78
351-10-1XX-00-003000	5503	79	442-XX-2XX-00-591000	4259-1	83
351-10-1XX-00-004000	5504	79	442-XX-2XX-00-592000	4259-2	83
351-10-1XX-00-005000	5505	79	442-XX-2XX-00-593000	4259-3	83
351-10-1XX-00-009000	5509	79	442-XX-2XX-00-594000	4259-4	83
351-10-1XX-00-010000	5510	79	446-XX-2XX-41-012000	4612	74
351-10-1XX-00-011000	5511	79	446-XX-2XX-41-013000	4613	74
351-10-1XX-40-002000	5102	50	449-10-2XX-00-560000	4956-1	59
353-XX-1XX-00-001000	5301	86	450-XX-2XX-00-001000	0290	52,85
360-XX-1XX-00-001000	0282	84	450-XX-2XX-00-006000	3404	47
362-XX-1XX-00-001000	1106-2	86	450-XX-2XX-00-106000	3404	51
363-XX-1XX-00-001000	1106-3	86	451-10-2XX-00-003000	5503	80
364-10-1XX-00-580000	6458	78	451-10-2XX-00-004000	5504	80
370-XX-1XX-00-001000	0700	84	451-10-2XX-00-005000	5505	80
373-XX-1XX-00-001000	0730-3	86	451-10-2XX-00-009000	5509	80
380-XX-1XX-00-001000	8000	48,84	451-10-2XX-00-010000	5510	80
382-XX-1XX-00-001000	8301-2	86	451-10-2XX-00-011000	5511	80
383-XX-1XX-00-001000	8301-3	86	453-10-2XX-00-001000	5301	87
388-XX-102-11-740799	8874	152	460-XX-2XX-00-001000	0282	85
388-XX-102-11-740800	8874	152	463-XX-2XX-00-001000	1106-3	87
395-XX-101-03-380000	8433	151	464-10-2XX-00-580000	6458	78
395-XX-101-07-350000	8994	151	470-XX-2XX-00-001000	0700	85
395-XX-101-34-340000	8993	151	473-XX-2XX-00-001000	0730-3	87
399-XX-1XX-10-003000	1103	46	480-10-2XX-00-001000	8000	48,85
399-10-1XX-10-007000	1960	21.1	483-XX-2XX-00-001000	8301-3	87
399-10-1XX-10-008000	1940	20	499-XX-2XX-10-003000	1103/1602	47
399-XX-1XX-10-009000	5011	46	499-10-2XX-10-007000	1958/1960	21.2
399-XX-0XX-21-300000	9930	41	499-10-2XX-10-008000	1938/1940	21
399-XX-0XX-00-310000	9931	41	499-10-2XX-10-009000	5011/5113	47
410-XX-2XX-10-001000	1001	134	507-10-XXX-XX-XXX437	0737	140
410-XX-2XX-10-002000	1001	134	510-XX-XXX-XX-XXX00X	1001	138
410-XX-2XX-41-001000	1001	47,66	511-XX-XXX-XX-XXX00X	0134	138
410-XX-2XX-41-105000	1005	51	513-XX-XXX-XX-XXX085	1385	138
411-XX-2XX-41-001000	0134	66	514-XX-XXX-XX-XXX034	1434	138
414-XX-2XX-41-117000	1434	49	515-XX-XXX-XX-XXX00X	0501	138
415-XX-2XX-41-001000	0501	66	518-XX-XXX-XX-XXX00X	180X	138



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522-XX-XXX-XX-XXX00X	0089-2	138	801-43-0XX-10-212000	1303	64
523-XX-XXX-XX-XXX00X	0088-3	138	801-XX-0XX-20-001000	1305	54
540-10-XXX-XX-XXX448	4048	142	801-43-0XX-20-201000	1305	64
540-10-XXX-XX-XXX454	4054	142	801-43-0XX-30-001000	1304	59
540-10-XXX-XX-XXX498	4098	142	801-XX-0XX-40-002000	1303	59.1
540-44-XXX-17-40000X	N/A	145	801-XX-0XX-61-001000	4614	56
550-XX-XXX-XX-XXX012	5012	140	801-XX-0XX-62-001000	4615	56
551-XX-XXX-XX-XXX003	5503	140	802-XX-0XX-10-001000	7007	55
551-XX-XXX-XX-XXX004	5504	140	802-XX-0XX-10-002000	5016	53
551-XX-XXX-XX-XXX005	5505	140	802-XX-XXX-10-004000	3077	62
579-10-XXX-XX-XXX429	7929	142	802-XX-0XX-10-007000	1107	61
582-11-XXX-XX-XXX414	8214	142	802-10-0XX-10-052000	5016	58
587-10-XXX-XX-XXX437	8737	142	802-XX-0XX-20-001000	5005/5107	55
594-XX-020-01-007032	8857-X	133	802-10-0XX-30-001000	7007	59
599-11-XXX-XX-XXX428	9928	142	802-10-0XX-30-052000	5016	58
599-10-XXX-XX-XXX429	9929	142	802-XX-0XX-61-001000	5601	57
599-11-XXX-XX-XXX453	9953	142	802-10-0XX-61-051000	5607	58
599-XX-XXX-XX-XXX476	9976	140	802-XX-0XX-62-001000	5602	57
605-XX-XXX-11-480000	0548	114	803-XX-XXX-10-001000	1304	55
605-XX-XXX-XX-XXX048	0548	139	803-XX-0XX-10-002000	1303	53
612-XX-XXX-41-001000	0255	112	803-XX-0XX-10-003000	1303	52
612-XX-XXX-41-002000	8855	112	803-XX-XXX-10-004000	1313	62
612-XX-XXX-41-003000	0135	112	803-13-0XX-10-007000	1134	61
612-XX-XXX-41-004000	0132	112	803-XX-XXX-20-001000	1305/1306	55
614-XX-XXX-31-002000	0442	115	803-XX-XXX-30-001000	1304	59
614-XX-XXX-31-007000	1407	114	803-XX-XXX-61-001000	4614	57
614-XX-XXX-31-012000	0552-1	115	803-XX-XXX-62-001000	4615	57
614-XX-XXX-31-018000	0552-2	115	804-10-0XX-10-002000	5016	60
614-XX-XXX-41-001000	1401	113	805-43-0XX-10-012000	1303	60
614-XX-XXX-XX-XXX007	1407	139	807-22-001-30-00X101	0900-X	19.3
614-XX-XXX-XX-XXX012	0552-1	139	807-22-001-30-00X191	0900-X	19.3
614-XX-XXX-XX-XXX0XX	1401	139	808-10-040-10-151000	3501/3502/3503	58.2
712-XX-XXX-41-001000	0255	75	809-43-040-10-001000	0405/8852/9324	58.2
714-XX-XXX-31-007000	1407	76	810-22-0XX-40-001101	0916-0	10
714-XX-XXX-31-012000	0552-1	77	811-22-0XX-30-00X101	0900-X	07
714-XX-XXX-31-018000	0552-2	77	811-22-00X-30-00X191	0900-X	12
714-XX-XXX-41-001000	1401	76	812-22-0XX-30-00X101	0907-X	08
800-XX-0XX-10-001000	7007	54	812-22-0XX-30-01X101	0907-X/0908-X	11
800-XX-0XX-10-002000	5016	53	812-22-00X-30-00X191	0907-X	12
800-XX-0XX-10-004000	3077	62	813-22-0XX-30-00X101	0900-X	07
800-XX-0XX-10-007000	1107	61	813-22-0XX-30-00X191	0900-X	12
800-10-0XX-10-052000	5016	58	814-22-0XX-30-00X101	0907-X	08
800-XX-0XX-20-001000	5005	54	814-22-0XX-30-01X101	0907-X/0908-X	11
800-10-0XX-20-201000	5005	64	814-22-0XX-30-00X191	0907-X	12
800-10-0XX-30-001000	7007	59	815-22-0XX-30-001101	0965	06
800-10-0XX-30-052000	5016	58	816-22-0XX-10-00X101	0908-X	15
800-10-0XX-40-002000	1502	59.1	817-22-0XX-30-001101	0965	06
800-XX-0XX-61-001000	5601	56	818-22-0XX-10-00X101	0908-X	15
800-10-0XX-61-051000	5607	58	819-22-0XX-30-001101	0913-0	09
800-XX-0XX-62-001000	5602	56	819-22-0XX-30-001191	0913-0	12.1
801-XX-0XX-10-001000	1304	54	820-22-0XX-30-001101	0913-0	09
801-XX-0XX-10-002000	1303	53	820-22-0XX-30-001191	0913-0	12.1
801-XX-0XX-10-003000	1303	52	821-22-0XX-10-00X101	0906-X	13
801-XX-0XX-10-004000	1313	62	823-22-0XX-10-00X101	0906-X	13
801-13-0XX-10-007000	1134	61	824-22-0XX-00-001000	0933	17
801-XX-0XX-10-012000	1303	53	825-22-0XX-10-001101	0914	14
801-XX-0XX-10-013000	1303	52	826-22-0XX-00-001000	0933	17
801-43-0XX-10-201000	1304	64	827-22-0XX-10-001101	0914	14



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829-22-0XX-20-00X101	0929, 0970	16	853-XX-XXX-30-001000	4890-0	37
830-XX-0XX-10-001000	5012	43	854-22-0XX-10-001101	0950-0	18
830-10-0XX-10-003000	1951	22.1	854-22-0XX-30-001101	0951-0	19
830-10-0XX-10-004000	1952	22.1	855-22-0XX-10-001101	0950-0	18
830-XX-0XX-20-001000	3790	45	855-22-0XX-30-001101	0951-0	19
830-XX-0XX-30-001000	6218	44	855-22-0XX-30-002191	0951-0	19.1
830-XX-0XX-30-002000	6218	44	856-10-0XX-10-051000	1933	22
830-10-0XX-30-003000	1949	22.1	856-10-0XX-30-051000	1935	22
830-10-0XX-30-003191	1949	22.1	857-10-0XX-10-051000	1933	22
830-10-0XX-30-004000	1950	22.1	857-10-0XX-30-051000	1935	22
830-10-0XX-30-004191	1950	22.1	860-10-0XX-10-002000	3039	33
830-XX-0XX-40-028000	3028	59.1	860-10-0XX-30-002000	3039	33.1
831-XX-0XX-10-001000	1802	43	861-13-0XX-10-002000	0439	33
831-XX-0XX-20-001000	1805	45	861-13-0XX-30-002000	0439	33.1
831-XX-0XX-30-001000	1802	44	862-XX-121-00-180000	6218	127
831-XX-0XX-30-002000	1802	44	862-10-121-30-180000	6218	128
832-XX-XXX-10-001000	5012	43	870-10-0XX-20-001000	3790	42
832-10-0XX-10-003000	1951	22.2	871-XX-0XX-20-001000	1805	42
832-10-0XX-10-004000	1952	22.2	888-30-005-20-002000	5065/5066	58.1
832-10-0XX-10-052000	3143	45.1	888-93-005-00-001000	5070/5084	58.1
832-XX-XXX-20-001000	3790/3796	45	891-10-064-30-120000	N/A	32
832-10-0XX-20-052000	3160/3161	45.1	893-43-064-30-420000	N/A	32
832-XX-XXX-30-001000	6218	44	896-43-004-00-000000	N/A	148
832-10-0XX-30-003000	1949	22.2	896-43-004-90-000000	N/A	148
832-10-0XX-30-003191	1949	22.2	896-43-005-40-100001	N/A	150
832-10-0XX-30-004000	1950	22.2	896-43-008-90-000000	N/A	148
832-10-0XX-30-004191	1950	22.2	896-46-009-90-300000	N/A	147
832-10-0XX-30-052000	3143	45.1	897-43-004-90-000000	N/A	148
833-XX-XXX-10-001000	1802	43	897-43-005-00-100001	N/A	150
833-10-XXX-10-002000	1802	45.1	897-46-009-90-300000	N/A	147
833-43-XXX-20-001000	1805/3805	45	897-10-010-00-300002	N/A	149
833-XX-XXX-30-001000	1802	44	897-10-010-40-300002	N/A	149
834-XX-0XX-10-001000	3435	63	898-43-024-90-310000	N/A	149.1
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