

R3 (R cubed) Specifications and Data Sheet

The R cubed products primarily serve 3 Industrial applications:

- Tote/Pallet/Carrier identification of widgets through production
- Mold/Tool identification
- Automated Guided Vehicles



Certainly not limited to these 3 applications, the R cubed products excel at any industrial identification need where tough, 100% dependable systems are necessary. R cubed stands for **Rapid, Robust and Reliable**.

This document contains:

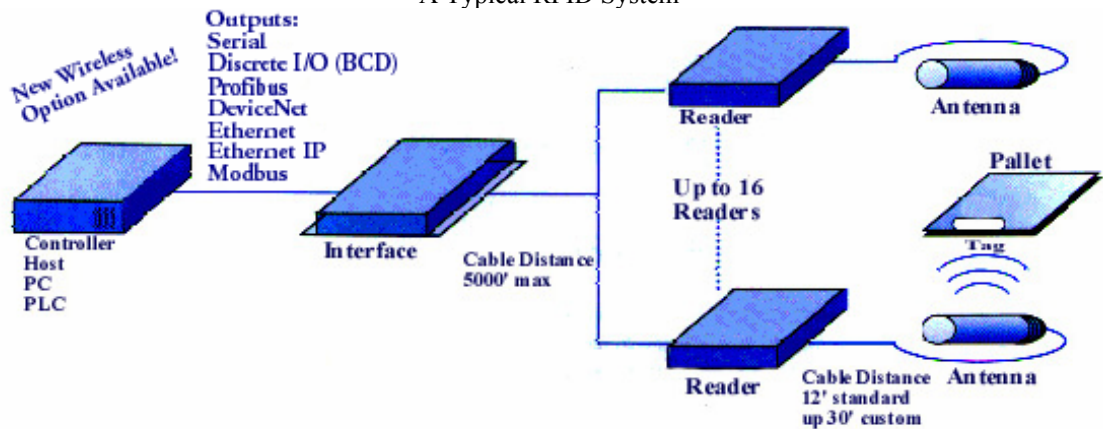
1. Components of an RFID System
 2. How to put a Read Station Together
 3. Transponder SpecificaPtions
 4. Read Head/Antenna Specifications
 5. Reader Specifications
6. Interface Specifications
 7. Programmer Specifications
 8. Transponder Programming
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The reader of this document need not have an in depth knowledge of Radio Frequency Identification technology as also contained herein is a basic tutorial and explanation as to how RFID, Inc.'s particular technology operates.

1. Functional Summary – 4 Components of an RFID system.

1. A Tag or Transponder , carrying our proprietary EEPROM IC with 8, 16, or 32 characters of memory. Once this passive device enters the Read Head's RF field it is powered up and begins transmitting its data.	
2. A Read Head/Antenna , powered by the Reader and linked via 12' of supplied cable, constantly broadcasts an RF signal and waits for a Tag's reply.	
3. A Reader , powering the Read Head, receives the digitally coded Tag data from the Read Head, filters, boosts and digitally transmits the data to the Interface up to 5000' away.	
4. An Interface , simply transfers the signal into an understandable computer language, like serial for a PC port or parallel (binary) for a PLC.	

A Typical RFID System



2. Putting Together a Read Station

Some of our products offer a combination of the four components summarized above in a single housing or PCB. For example the Read Head and Reader can be combined (Models 1880 and 1885) needing only then to be linked to an Interface. Or the Reader and Interface can be combined (Model 4000 and 5000 series) needing only then to have a Read Head/Antenna attached.

The R cubed systems are also described as being configured either simplex or multiplex. Simplex being a single Read Head/Antenna and Reader per a single Interface, and multiplex being up to 16 addressable Read Heads/Antennas and Readers per a single Interface.

Determining which **Interface and Reader** best fits your needs?

1. What protocol do you desire from the Interface?

Output	Parallel	Serial
Model	2024E	2002E, 2022E, 3030E, 4000E, 5000E

2. Do you want each individual Read Station cabled to a single port/computer or decision making device (Simplex)

Output	Simplex	Multiplex
Model	2024E, 2002E, 3030E, 4000E, 5000E	2024E, 2022E

Determining the **Tag and Read Head:**

1. Mounting Considerations, metallic or non-metallic.

Reader. There is an Antenna that can be mounted directly to metal, Model 5110. Flat Read Heads (5150, 5160, 5170) can be mounted directly to a metal post and still achieve maximum performance however avoid mounting a flat Read Head on a complete surface of metal, that is, covering its entire area. If necessary, space a flat Read Head half its diameter from the flat metal surface to achieve the full performance. Models 5100 and 5120 can also be mounted on metal but not screwed into a metal bracket.

Tag. Any Tag Model number followed by an "M" denotes Tags that can be mounted directly to metal. However, any Tag can be mounted to metal using the spacing rule of thumb, one half the Tag's diameter.

2. Read Range or Write Range, the maximum distance between the Tag and the Read Head. Your needs dictate your choice, but if your read range needs are flexible and attachment is more important, go directly to Tag Specifications and view the photos and drawings. There are read range differences between Readers powered by 24 VDC and 12 VDC. These matrixes assist in defining that choice.

READ RANGES IN INCHES

(24 Volt Systems - 2002, 2022, 2024)

Read Head	5101	5110	5100	5120	1880 1885	5150	5160	5170	5140
Tag									
1774 1775	1-2	1-2	1-2	1-2	1-2	1-2	--	--	--
1771 1772 1773 1792 1796	3	4	4.5	5	6	6.5	7	5	--
1782M	3.5	3.5	4.5	6	6	6.5	8.5	6.5	--
1781M 1787 1791M	4.5	5.5	6.5	9	10	10	13	14	10
1770 1783 1785 1791 1786M	5	7.5	8.5	9.5	12	12	15	15.5	13
1795	7	11.5	13	17	18	19	24	26	37

(12 & 24 Volt Systems - 4000, 5000)

Read Head	5101	5110	5100	5120	5150	5160	5170
Tag							
1774 1775	1-2	1-2	1-2	1-2	1-2	--	--
1771 1772 1773 1792 1796	2	3	3	2.5	4.5	3	--
1782M	2.5	2.5	3	4	4.5	3.5	--
1781M 1787 1791M	3.5	4	4.5	6.5	7	8.5	7
1770 1783 1785 1791 1786M	4	5.5	6	6.5	9	10.5	9
1795	6	8.5	8.5	10	12	16	26

Read Stations Illustrated

It should be noted for Readers and Interfaces, any Model number consisting of only numerics is a PCB level component only with no housing or cabling. The addition of an “E” to any Model number then denotes Enclosure and appropriate cabling.

Simplex Systems

Parallel, BCD protocols

1. Model 2024E Interface + Model 1880E combo Reader/Read Head



2. Model 2024E Interface + Model 1840E Reader + any Model 51xx series Read Head



Serial Protocols

3. Model 2000E Interface + Model 1880E combo Reader/Read Head



4. Model 2002E Interface + Model 1840E Reader + any Model 51xx series Read Head



5. Model 4000E/5000E series combo Interface/Reader + any Model 51xx series Read Head



Multiplex Systems

Parallel, BCD protocols

6. Model 2024E Interface + Model 1885E combo addressable Reader/Read Head



7. Model 2024E Interface + Model 1845E addressable Reader + any Model 51xx series Read Head



Serial protocols

8. Model 2022E Interface + Model 1885E addressable combo Reader/Read Head



9. Model 2022E Interface + Model 1845E addressable Reader + any Model 51xx series Read Head



3. General Specifications for all R³ Transponders:

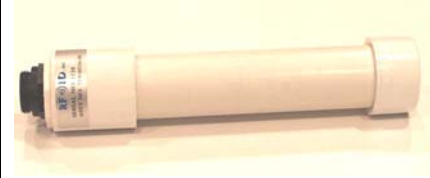
Power:	Passive, no defined term of life
Memory:	8, 16 or 32 ASCII characters, larger memory can be accommodated
Programming:	R/O or R/W
Frequency:	148 KHz receive, divide by 4 = 37 KHz return
Read Time:	12 to 50 ms, dependent upon Tag memory
Temperatures:	-60 to +199 degrees C in most cases, 246 degrees C (475 degrees F) compounds also available
Read Ranges:	Up to 1 meter, dependent on Tag and Read Head combination used. See the matrixes on page 2.
Packages:	Black Tags are usually potted epoxy in a polyurethane housing White Tags are usually hard plastic shell or laminate
Durability:	Potted Tags are extremely durable, inert to practically every acid and solution Direct hits from hammers or forklift tong cannot break the potted units

	Model 1770 "ISO Card Tag" Maximum read range of 15" Credit card size and thickness Magnetic swipe strip optional Laminated gloss or matt finish	3.75" x 2.125" x 31 mils Ask for a mechanical drawing to be emailed to you.
	Model 1771 "35mm Disc Tag" Maximum read range of 7" Center hole Laminate	35mm diameter x 2mm, w/4mm center hole 1.38" x .0625", w/.15625 center hole
	Model 1772 "22mm Disc Tag" Maximum read range of 7" Center hole Potted	22mm diameter x 3mm thick, w/4mm center hole .875" diameter x .125", w/.15625 center hole
	Model 1773 "Key Chain Tag" Sealed Plastic	2.375" x 1.625" x .125"
	Model 1774 "Coffin Tag Tag" Extremely small architecture Plastic	.5" x .25" x .125"
	Model 1775 "Glass Ampoule Tag" Extremely small architecture	2mm diameter x 12mm length
	Model 1781M "Bar Tag" Maximum read range of 14" Potted Two mounting holes	3.5" x .90" x .90"

Tags continued

	Model 1783 “Tough Thin Tag” Maximum read range of 15.5” Credit card in size with thick plastic shell Optional 1783H attachment housing pictured	2.13” x 3.38” x .16”
	Model 1785 “Medium Round Tag” Maximum read range of 15.5” Potted Two mounting holes offer very secure attachment	.53” x 3.375” diameter
	Model 1786M “Hockey Puck Tag” Maximum read range of 15.5” Potted Two mounting holes offer very secure attachment	1.19” x 3.35” diameter
	Model 1787 “Lipstick Tag” Maximum read range of 14” Potted Cylindrical housing for in floor mounting	2.3” x .75” diameter
	Model 1791 “Deck of Cards Tag” w/ read range of 15.5” or Model 1791M “Deck of Cards Tag w/read range of 14” Potted, Two mounting holes	2.17” x 4.05” x .55”
	Model 1795 “Frisbee Tag” Maximum read range of 37” Potted Two mounting holes	6” diameter

4. Read Head/Antenna Specifications

Inductance: 1.1 mH +/-2% @ 10 kHz Temperature: -60 to +199 degrees C Resistance: 3 to 8 ohms max., dependent on Model, Self Resonant Packages: ABS, Ultradur, Noryl, PVC, Ployurethane Encapsulant All Read Heads are sealed and watertight Connector: 3 pin male receptacle mates with Model 5100A1 Cable Cabling: 12' recommended as attenuated with capacitance on Reader, 1' to 30' can be customized		
	Model 5100 Medium Prox Read Head Threaded proximity sensor type package Hex nuts for securing	(drawing) Ask for a mechanical drawing to be emailed to you.
	Model 5101 Small Prox Read Head Threaded proximity sensor type package Hex nuts for securing	(drawing)
	Model 5110 Hockey Puck Read Head Mountable on metal Several mounting holes Highly rugged	(drawing)
	Model 5120 10.5" Tubular Read Head Highly rugged Potted in PVC	(drawing)
	Model 5140 4'x2' Extended Range Read Head Sealed in PVC Bury in the ground or stand up at gate for use in Automatic Vehicle Identification applications	(drawing)
	Model 5150 7"x7" Flat Pack Read Head Sealed in ABS plastic Multiple mounting possibilities	(drawing)
	Model 5160 12"x12" Flat Pack Read Head Sealed in ABS plastic Multiple mounting possibilities	(drawing)
	Model 5170 21"x17" Flat Pack Read Head Sealed in ABS plastic Multiple mounting possibilities Perfect for underside of Forklift	(drawing)

5. Reader Specifications

Connectors: Angle entry terminal strips on PCB Cable glands on Enclosure	Current: Simplex: 200 mA (max) 150 mA (typ) Multiplex: Enabled 200 mA (max), 150 mA (typ) Disabled 30 mA (max)
Voltages Simplex: Regulated DC Supply +18 to +32 V Regulated AC Supply 24V (+10/-20%) RMS 47-63 Hz Multiplex: Regulated DC Supply +18 to +32 V	Output: 75 ohms, balanced Temperature: Operating -40 to +55 degrees C Non-Operating -55 to +85 degrees



Model 1840E Simplex Reader
FCC Approved
Approximate size is 4.75" x 4.75" x 2"



Model 1845E Multiplexing Reader
FCC Approved
Addressable
Approximate size is 4.75" x 4.75" x 2"



Model 1841E Dual Reader (handles 2
non-addressable Read Heads)
FCC Approved
Approximate size is 8" x 6" x 3"

Combination Read Head and Reader

These "combo" Readers offer a Read Head etched into their PCB, negating the need for an external Read Head. Needing to be linked only to an Interface, this unit offers a two piece Read Station Solution.



Model 1880E Combo Simplex Reader/Read Head
FCC Approved
Approximate size is 8" x 8" x 1.5"



Model 1885E Combo Multiplex Reader/Read Head
FCC Approved
Addressable
Approximate size is 8" x 8" x 1.5"

6. Interface Specifications

Model 2002E Simplex serial Interface

Model 2022E Multiplex serial Interface

Full-duplex, asynchronous data stream

RS-232-C, RS-422-A, configured DTE

Stop and parity bits selectable

110-19,200 baud rate

Three Operating Modes

Mode 1 Direct Single Report upon read

Mode 2 Polled for read data

Mode 3 Direct Multiple Report upon read

Buffered read storage:

4 readings for the 2002E, 2 reading for the 2022E

Protocols and modes selectable through commands

or via pins and shunts on PCB

Many other commands available

Connectors DB-25S, DIN 41612 Type C

Control Signals DSR, CTS, DTR

Compatible to all Readers, wired via twisted pair

Temperature range -40 to +55 degrees C operating

-55 to +85 degrees C non-operating

Power: 2002E = 5VDC (+/-5%) @ 250 mA maximum

2022E = 5VDC (+/-5%) @ 350 mA maximum

CRC algorithm allows 1 in 10 to the 14th errors



Packaged in a finned metal enclosure

Model 2024E Simplex or Multiplex BCD/Hex Interface

Addressable, ideal for use with a PLC

Binary coded decimal (BCD) or hexadecimal

Sixteen 24 volt data lines, current-sourcing

LED's for each line indicate signal status

Hand shaking lines

Three Operating Modes for Tag reporting

Mode 1 Simplex, 16 bits data in 4 hex characters

Mode 2 Multiplex, 12 bits data in 4 hex characters + a 4 bit address

Mode 3 Multiplex polling, 12 bits data in 4 hex characters + a 4 bit address

Stores up to 8 readings

Connection by Screw Terminals, 9 pin RS-232-C

Compatible to all Readers via twisted pair

CRC algorithm allows only 1 in 10 to the 14th errors

Power by 24 VDC +/-25% @ 150 mA max

Input impedance 10 Kohms

Input level low of 0 to 10 volts

Input level "high" of 15 to 24 volts

Protected against polarity reversal

Output leakage current level "low" of 0.1 mA max

Output voltage "high" of Vsupply -1.5 V minus (IL <=100 mA)

Output current level "high" is current limited, 100 mA (max)

Protected against load short circuit

Packaged in hardened sheet metal

Mountable into standard industrial racks

Temperature: -40 to +55 degrees C operating

-55 to +85 degrees C non-operating



Note: Power wiring for Models 2002E, 2022E;

5 VDC can be wired directly to Interfaces and 24 VDC directly to Readers OR

a dual power supply can be used to wire 5 VDC to Interface and 24 VDC through the Interface to Readers.

Power wiring for all Models requires use of regulated power supplies for maximum results, linear power supplies are rated as acceptable. Linear power supplies may not be used.

Combination Interface and Reader Model 4000 and 5000 series

This Interface & Reader/Programmer combo unit requires only a Read Head to complete the system. If you require a Read Head internal as a 1 piece total solution, ask our sales department about the Desk Top Model as we have supplied several customized versions. The 4000 series is a Read Only device while the 5000 series is a Read Write device. Operating at 12 VDC or 24 VDC offers the flexibility to take advantage of whatever power may be available. There is also an option to increase the Tag Memory to 1k bits or 160 ASCII characters that has not yet been developed by us, so please inquire if needed.

<u>Model</u>	<u>VDC</u>	<u>Tag Memory</u>
4000E-RO	12	16 Characters
4001E-RO	24	16 Characters
4002E-RO	12	8 Characters
4003E-RO	24	8 Characters
4004E-RO	12	32 Characters
4005E-RO	24	32 Characters

<u>Model</u>	<u>VDC</u>	<u>Tag Memory</u>
5000E-RW	24	8 Characters
5001E-RW	24	16 Characters
5002E-RW	24	32 Characters
5003E-RW	12	8 Characters
5004E-RW	12	16 Characters
5005E-RW	12	32 Characters

The 8 character Models are designed to achieve reads at very high speeds, actual Tag speeds to 100 mph. Including the processing speeds from Tag to serial port assuming only 9600 baud, reads are achieved worst case 23.4 ms and best case 11.7 ms.

The Model 5000 series products are unique in the RFID market for being able to program Tags at 100% of the read range. See the read range matrixes at the bottom of page 2 of this document.

Common specifications:

Half-duplex asynchronous with or w/o handshaking, DTE configured

110-19.2 selectable baud rate

Single read or Multiple reads Direct Report Modes

7 bits with even or odd parity, 7 or 8 bits with no parity selectable

Protocols selectable via pins/shunts on PCB or through commands

Signal lines of Tx/D, Rx/D, CTS, RTS, DTR

Connection via angle entry terminal strip

Temperature:

RS-232-C operating -40 to +55 degrees C

RS-422-A operating 0 to +55 degrees C

Both non-operating -55 to +85 degrees C

Packaged by watertight polycarbonate

CRC algorithm allows only 1 in 10 to the 14th errors

Automatic power up and self test message

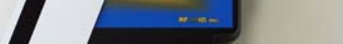
Approximate size is 4.75" x 4.75" x 2"



7. Specifications for Programmer/Hand Held Reader Model 3036E

This Programmer operates stand alone, without the use of a PC, via AC connection or by use of batteries.

- No software is required to program Tags
- No future software upgrades are needed
- Saves the cost of a PC dedicated to programming
- Large programming pad area
- LCD screen
- Automatic number generator for sequential programming
- Approximate size is 9" x 5" x 1.75"
- Temperature:
 - 40 to +55 degrees C operating
 - 55 to +85 degrees C non-operating

The image shows a handheld electronic device, identified as a 'UNIVERSAL TAG PROGRAMMER'. It has a blue casing and a small LCD screen at the top which displays the same text. Below the screen is a grid of buttons: a numeric keypad (0-9), function keys like 'ABC', 'DEF', 'GHI', 'JKL', 'MNO', 'PQRS', 'STU', 'VWX', 'YZ', and 'END', and other controls like 'NEW SETUP', 'ALPHA', 'ENTER', 'FWD PROG', and 'SAVE'. A white card or tag is partially visible behind the device.

8. Tag Data and Programming

With the serial Interfaces, data is sent back to a serial port in the following format: <LF>nnnnnnnnnnnnnnnnnnnn<CR>, where variable n represents data. If a multiplex system is being used the Tag data is preceded by a hexadecimal character indicating the Read Station and a space character. If you intend to have Tags programmed at our factory, please fill out a programming sheet, contained herein with instructions. Tag orders cannot be accepted until this sheet has been filled out and submitted. This sheet can also be accessed on our web site under the R³ link.

With the parallel Interfaces, data is sent back in a binary format: 0000 0001 0111 1111 represents 17F as the first 4 digits are reserved for multiplex addresses if applicable.

These instructions have been made for the purpose of helping our users to order the correct programming information on their RFID Tags. When you order a Tag from us we will ask you to supply the programming numbers you wish to be encoded into the Tag's memory.

Tags have a memory that contain 8, 16 or 32 characters. All of those characters must be used. It is a common misbelief that if you want the identification number 99 (ninety-nine) all you need to tell us is “99.”

Not so. We need to know how to fill in the remaining 30 characters. Most users simply desire zeros to be filled into the unused characters. Others require dashes. We also need to know whether or not you desire e number 99 to be right, left or center justified.

For example, right justified is: 000000000000000000000000099
Left justified is: 9900000000000000000000000000000
Center justified is: 0000000000000009900000000000000

Tags intended for use with our Model 2024E Parallel Interface must be right justified and limited to 4 characters in the simplex mode and 3 characters in the multiplex mode, 0 thru 9 and A thru F.

If you are a current user and do not know the exact programming format your company uses, ask an engineer or technician who works with our equipment. Once you learn this, please keep it in min or noted somewhere for future orders. If you have ordered direct from RFID before, our customer service department can look up your last order and help you determine what programming format to use.

Following is a programming sheet you also need to fill out, sign, and remit with your order. 32 Character users should use 2 lines, below. 8 Character users, please fill in only 8 characters.

Transponder Programming Sheet

Customer name: _____ P.O # _____

Completed by: _____

Unspecified characters filled with: _____ Tag Model # _____

[illegible]

Customer Signature: _____

Date: _____

9. Customer List

USA Medical:

Abbot Labs
Advanced Bionics
Ameripharma
Anthem Prescription
Boston Scientific
Cardinal Health
CDS/Procare
Cigna Tel-Drug
CR Bard
CVS
Eckerd Drug
ExcelleRx
FamilyMeds.com
Kaiser Permanente
McKesson SI/Baker
Medtronic
Pacifcare
Prescription Solutions
Rite Aid
Rx Direct
Smith's Medical
Tel-Drug
Veteran's Admin
Walgreens
Wellpoint
Wyeth Labs

USA Automotive:

Allen Bradley
ATS
Bendix
Caterpillar
Daimler Chrysler
Decoma
Delphi
Detroit Diesel
DT Industries
Federal Mogul
Ford Motor Company
General Motors
Honda
Howmet
John Deere
Meridian Automotive
Michelin
Neaton Automotive
Polaris Industries
Toyota
Trident Automotive
Visteon
Volvo

USA WIP:

Alcoa
Amana

Asyst Technologies
AT&T/Lucent
Avtron
BAE Automation
Boeing Corporation
Borg Warner
BW Rogers
Cameron Barkley
Carlton Bates
CEI Automation
Charbroil
Copeland
Cutler Hammer
Eastman Kodak
EI DuPont
Electrolux
Eskay
Esselte
Estee Lauder
Flexlink Conveyors
Frigidaire
General Electric
Hagemeyer
Ingersol Rand
Key Handling Sys
Kim Automation
Knapp Automation
Krauss-Maffei
Lear Jets
Marshall's
Maytag
Motorola
Nat'l Control Sys
Osh Kosh B'Gosh
Decoma
Osram Sylvania
Pepsi (Quaker)
Proctor & Gamble
Reliance Rockwell
Rockwell Automation
SCI Sanmina
Sears
SI/Handling Systems
Square D Company
Siemens
Stanley Tools
Swisslog
Texas Instruments
Schick
Thomson Electronics
TJ Maxx
TRW
Valeo Sylvania
Wepco
Whirlpool
Wunderlich-Malec

USA Discrete

Process Controls:

Ace Hardware
Conagra
Exxon Mobil
Inland Steel
Nestle
Nippon Steel
U.S. Steel

USA Routing/ASRS:

AGV Products
Amerden
Anheuser Busch
Jervis Webb
Lemans
Pilgrim's Pride
The Denver Post
The Boston Globe
Transbotics
U.S. Air Force

USA Entertainment

Customer Loyalty:

Bronx Zoo
Electrosonic
Hard Rock Café
Maltbie
NASCAR Museum
Northwest Airlines
Six Flags
Techno Media
Vail Resorts

USA Other:

Atmel/Temic
Computers Unlimited
EFI Vutek
H.E. Butt Grocery
Hewlett Packard
Honeywell
Los Alamos Labs
Lowry Computer
Magic Chef
NASA
Nokia
Rice Lake Weighing
Sandia National Labs
Timken
U.S. Navy

Asia:

IceGen (distributor,
India)
Electronic Corporation of
India

Tata Consultancy
Toyota (Japan)

Australia/Africa:

Alcoa World Alumina
BHP Billiton Iron Ore
Bynecut Mining
CMA Systems
Dampier Salt
Fortescue Metals
Hamersley Iron
Harmonic (dist, S.
Africa)
Logitech Consultants
Newcrest Telfer Gold
Mine
Pacific Automation (dist,
AUS)
Port Waratah
Queens Creek
Robe River Iron
Sinclair Knight Merz
ThyssenKrupp
Tomago Aluminum
Voest-Alpine

Canada:

AMT Mach Tools (dist,
Tor)
Aurora Bar Code
CIMS (distributor, BC)
City of Fort St. John
CraneSmart
Dofasco
GLC Controls
(distributor, BC)
Kellogg's Cereal
Kielhauer
LSZ Papertech
Rotalec (distributor)
Synergex (distributor,
Toronto)
Stelco Steel

Central & South

America:

EGO (distributor,
Mexico)
General Electric
(Mexico)
Hylsa (Mexico)
IdeaNet (distributor,
Chile)
Lasso (distributor,
Mexico)
MABE Leiser (Mexico)
SCI Sanmina (Mexico)

Retex (Peru)
RSI (Mexico)
TecWise (distributor,
Brazil)
Thomson Electronics
(Mexico)
Trends (distributor,
Brazil)
TRW (Mexico)

Europe:

AST (Swiss)
Efaced (Portugal)
FQ (distributor, Spain)
Infos (distributor,
Portugal)
London Heathrow
Airport
Louis Vaughn
(distributor, UK)
MDA Systems (France)
Moncks & Crane (UK)
SCI Sanmina (Hungary)
Securitas (Sweden)
Tempore (Austria)
TRW (UK & Germany)

USA Distributors:

Applied Automation
(NY)
Applied Controls (PA,
MD, DE)
Axis, Inc. (NJ, NY)
C&E Sales (IN, OH, KY)
Cassady Co. (AK, OK,
LA, TX)
Cornerstone (TN, AL,
GA)
Cross Automation
(NC, SC, VA, FL, AL, GA)
Gibson Eng. (MA, CT,
ME, RI)
Industrial Controls (west
MI)
MSI Tech (CO, UT, AZ)
Power Motion (MO, KS)
Power/mation (MN, IA,
WI, IL)
Precise Motion (FL)
Proud (western PA)
PRI (NY, NJ)
RR Floody (IL, IA)
Taylor Data (SC, NC,
FL)