

THE SERVICE DETAIL

Surface Analysis Systems Service Newsletter

April 1999

New Service Turbo Pump Repair

RBD now provides service on turbo and mechanical (roughing) pumps. Repairs include bearings, o-rings, and replacement of any damaged or missing screws. Pumps that require complete refurbishment will be evaluated and quoted. All pumps require a contamination tag prior to acceptance for repair. Please call RBD for prices.

Turbo Pumps Serviced:

Manufacturer	Model Numbers
Alcatel	5150, 5150CP, 5402
Balzers	TPU/H 040, 050, 060, 062, 100, 110, 170, 270, 300, 510
Leybold	TMP 150, 151, 360, 361

Mechanical Pumps Serviced:

Manufacturer	Model Numbers
Alcatel Pascal	2002, 2004, 2008, 2012 2005, 2010
Leybold	D2A, D4A, D8A (&AC), D16BC, D25BC
Welch	All 1300 & 1400 Series All 8800 & 8900 Series

What's New

New Product - We now have a PC Upgrade for the PHI 5100, 5300 and 5400 Systems. This new upgrade uses our RBD 147 System Interface in conjunction with our Windows™-based acquisition and transformation software. What a great way to upgrade your system for a very reasonable cost! See page 4 of this newsletter for more details.

Updated Web Site - The update of our website has been completed. The address is the same: www.rbdenter.com. We are pleased to provide you with information about our company and services as well as reference information to help with many aspects of surface analysis engineering. Any feedback would be greatly appreciated. Please send your comments to kimb@rbdenter.com.

New Product - RBD has just completed the development and manufacturing of the Thermo Valve Controller,™ also known as the TVC™. This is the only precision leak-rate controller for the Varian variable leak valve. See page 2 for more details.

In-House Repair Expands - RBD is now expanding more into VG and Kratos optics repairs, as well as offering more specials on PHI repairs. This month's special is a complete rebuild of the 04-303 Ion Gun. See page 11 for more details and coupon on back page.

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THERMO VALVE CONTROLLER™

The *only* precision leak-rate controller for the Varian™ variable leak valve.



The TVC™ is a system add-on, designed to maintain valve temperatures to $\pm 0.02^{\circ}\text{C}$. This ensures leak-rate stability over a wide range of varying ambient temperatures. The system is equipped with temperature transducer feedback. It can also be controlled externally with your choice of analog programming inputs, e.g., base system pressure.

The TVC™ comes complete with heater, all cabling, and also includes the Remote Meter with 25 feet of cable.

- ◆ Guarantees consistent and repeatable measurements
- ◆ Measures thin-film and interface thicknesses accurately
- ◆ Maintains constant sputter conditions during long profiles
- ◆ Prevents vacuum system dumps caused by runaway leak rates
- ◆ Rugged and reliable analog design

- ◆ Integral temperature transducer feedback for “stand-alone” operation
- ◆ Flexible input network for external control
- ◆ Heater head removable for bakeout
- ◆ 19” rackable chassis

Pricing (U.S. Domestic prices only)

- | | |
|------------------------------------|------------|
| ◆ Thermo Valve Controller (TVC) | \$2,425.00 |
| ◆ TVC Remote Meter | \$295.00 |
| ◆ TVC & Remote (sold as a package) | \$2,695.00 |

RBD New Products

Thermo Valve Controller Remote Meter *Remote Ion Gun Pressure Indicator*

The RBD TVC (Thermo Valve Controller) has an optional remote meter that can be purchased separately from the valve controller (see the previous page for details). This meter provides a well-placed indication of ion gun pressure, making it easy to adjust the ion gun gas pressure in situations where it is difficult to see the ion gun control or ionization gauge directly. This unit works as a stand alone unit only with the PHI 11-065 Ion Gun Control. It is a simple idea that really does make your system easier to use.



Bleeding the gas in can be difficult without a TVC remote meter



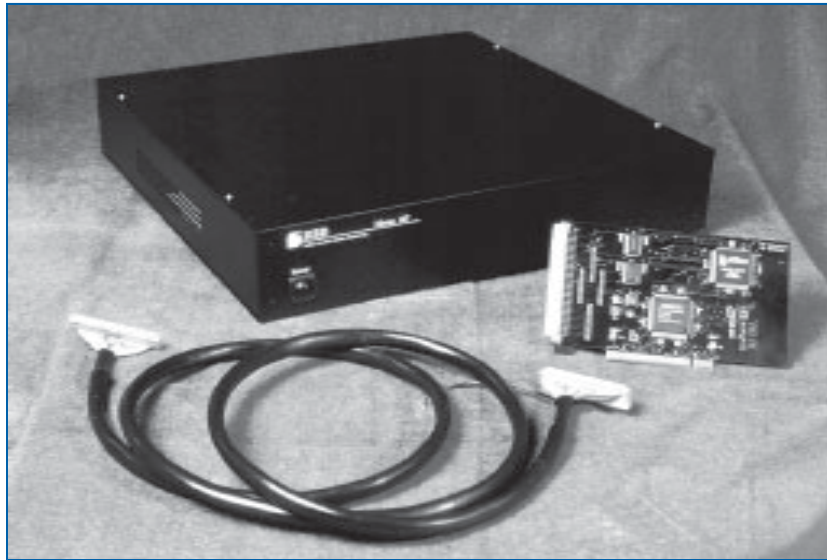
*System with the TVC Remote Meter
makes adjustments very easy*



Close-up of the RBD TVC Remote Meter

RBD New Products

RBD MODEL 147 PC INTERFACE UPGRADE



The RBD Enterprises Model 147 PC Interface is now available for your PHI 5100, 5300, and 5400 XPS Systems. This innovative new upgrade provides your system with a state-of-the-art PCI interface that provides all necessary system hardware control with the components shown above and with our RBD Y2K compatible software products. This upgrade allows Windows 95, 98, and NT control of data acquisitions and analysis. Our 147 hardware and software are powerful, versatile, and easy to use.

Some of the advantages of the 147 upgrade include:

- ◆ Runs on Windows 95, 98, or NT
- ◆ Versatile RBD software is powerful, easy to use, and takes advantage of Windows
- ◆ Easy to incorporate data into reports and publications
- ◆ Y2K compatible software
- ◆ Data can be sent over the Web
- ◆ Dramatically improved output - virtually any printer is supported
- ◆ Requires only one PCI slot
- ◆ System reliability is greatly improved
- ◆ An exceptional value - a fraction of what other upgrades cost
- ◆ Obsolete units are removed from the system
- ◆ No D.A.S.H. required (see page 5 for more details on this)
- ◆ Apollo or Perkin-Elmer computer is removed from the system

More on Model 147 on next page

RBD New Products

Before & After: Our Model 147 PC Upgrade



5400 system with an old obsolete Apollo Computer



A PC with Windows 95, 98, or NT: Factory loaded with RBD AugerScan software version 2.3. This replaces the Apollo and Perkin-Elmer computers and software.

B RBD Model 147 Package: This replaces the obsolete 72-488 and 72-490 computer interface cards. It consists of the Model 147 (seen in photo), a PCI system card, and all cable kits.

No D.A.S.H. Required!

One of the most common questions asked about PC upgrades is about D.A.S.H., PHI's data acquisition system hardware. Does RBD Enterprises' PC update require D.A.S.H.? And what is D.A.S.H., anyway?

Almost 10 years ago, before PC technology had advanced so rapidly, PHI developed D.A.S.H. to help reduce the workload on the computer and help speed up data acquisitions. With the relatively recent advances in PC technology, today's PCs are easily able to multitask and handle all aspects of data acquisition and massage. With this in mind, the RBD Enterprises PC update for the newer PHI systems does not require D.A.S.H., as all PHI upgrades do. This saves you thousands and thousands of dollars on the cost of updating your system to PC control and data massage.

The Apollo-based systems that RBD Enterprises can currently upgrade with our 147 Interface Unit include those on the following chart. Other systems listed below will have the 147 upgrade soon.

PHI System Model Number	Description
RBD Upgrades Available Now:	
5100	XPS System
5300	XPS System, extended lens
5400	XPS System, small spot
RBD Upgrades Available Soon:	
660	Scanning Auger System
5500	Multi-Technique System
5600	Multi-Technique System
6100	SIMS system
6300	SIMS system with Cesium and DP sources
6600	SIMS system with Cesium, DP, and FEI sources

Welcome to the first edition of Software Corner for 1999. Last year was quite a year for software news – the government took on Microsoft, AOL purchased Netscape, and a free operating system (Linux) out-paced all others for PC server installation. In light of all this exciting information, we'll try and keep our news a little less thrilling and stick to the everyday issues that concern our customers.

AugerScan 2.3

AugerScan 2.3 is now in Beta testing. While there will be some minor new features for Auger customers, the focus this time is on XPS. AugerScan can now be used for control of PHI 5100, 5300, and 5400 XPS systems, and includes many data analysis features, including curve fitting. If you have an XPS system, there's no better time to upgrade.

AugerMap 1.3

While development continues on AugerMap 2.0, we're happy to announce the release of AugerMap 1.3. This builds on the original AugerMap platform and includes line scans, and the ability to acquire high-resolution (1024 x 1024) images.

Tips and Tricks

In case you missed our 1998 Software Seminar, we've decided to take a few of the tips and tricks from the seminar and include them here.

File Management from Within AugerScan

AugerScan takes advantage of some Windows 95 features that allow file and folder management from within the application. If you are not already familiar with these tools, it will come as some surprise how much time and effort can be saved by using them.

The File Open and Save dialogs in Windows 95 (and supported by AugerScan) allow for almost all file management similar to that which you normally do in Explorer. Two of the icons on the top toolbar of the dialogs allow you to create new folders (directories), and to hide and show file details. When file details are shown, you can sort files by size, date, etc.

Also, you may find it surprising that you can rename files. By selecting a file, and hitting the F2 key, you can rename any file or folder. This often comes in handy when you want to save a file using an existing name. In the past, you would open your file manager, change the name of the file, and then come back to

save the new one. Right-clicking on a file brings up additional options for that file, including the ability to cut, copy, delete, or inspect properties. Almost any file management function can be performed from the Open and Save dialogs.

One especially handy feature to have in the File Open dialog is the Find command. Right clicking on a folder brings up an immediate choice of options, including the Find tool. From here you can search for files in any folder or drive (not just the one you have selected, although it is the default). This is especially handy if you are trying to open a file in an unknown location. You no longer need to use Explorer for this function. Folder sharing can also be turned on and off from here.

Separating AugerScan Graphics for Publishing

When you paste an AugerScan object into another application, the graphics are drawn as a Windows metafile. It's often desirable to manipulate these graphics as separate objects – for example, to move or delete a label or change the color of a graph object.

There are two ways to separate the AugerScan graphics. One is to use the Paste Special command, which is supported by most publishing and word processing applications. This pastes your acquisition as a metafile. (Note, however, that it is no longer an OLE object, and you cannot double-click to edit it as you normally would by just pasting.) You can now select each graphics object separately.

Another technique supported by many applications is the Ungroup command. By selecting the acquisition and choosing the Ungroup command, you can separate the graphics and manipulate them directly.

Turning Transformed Data into Raw Data

The following rule applies to all imported data: the data set being imported is always assumed to be raw data. Since the ASCII format does not include transformation descriptors, all imported data is assumed to be raw.

You can use this to your advantage. If, for example, you want to permanently change the raw data set of a survey to data that has been smoothed, simply export the smoothed data, and import it back in (don't forget to note and change the gun settings using the Acquisition Settings command, and clicking the Edit Gun Settings button).



Make Your Own Ta₂O₅ Sputter Rate Calibration Standard

In order to accurately calibrate your ion gun's sputter rate, you need a standard of a known thickness. You can either purchase a standard such as Ta₂O₅, or you can make your own if you have access to a chemistry lab. Following is a recipe to make a 1000Å Ta₂O₅ calibration standard. If you do not have the necessary facilities, you can purchase SiO₂ sputter rate standards from RBD Enterprises.

Ta₂O₅ Recipe

1. Polish two .125 mm foils of tantalum by dipping them for up to 2 seconds in an acid solution of 59% H₂SO₄, 17% HF, and 23.5% HNO₃.
2. Pass the samples through two rinses of de-ionized H₂O.

3. Blow them dry with N₂.
4. Using one of the polished foils as an anode and another as a cathode, apply 66.6 V DC between them while they are suspended in an electrolyte solution of 4.3% de-ionized H₂O and 5.7% HNO₃. One of these plates is sufficiently anodized when the current drops to zero.
5. Rinse the gold colored anodized foil in acetone. The gold color indicates 1000 Å of Ta₂O₅.

1000 Å SiO₂ Standard

If you can't make your own Ta₂O₅ standard, you can purchase a 4" 1000 Å SiO₂ standard wafer from RBD Enterprises for only \$150.00 each.

SiO₂ Wafer Cutting Procedure

Once you have purchased a SiO₂ wafer from RBD Enterprises, how do you cut it into pieces that will fit on your sample holders? The answer is, you don't! Instead of cutting it, follow this simple procedure to break it:

Caution: Safety glasses and gloves advised.

1. Set the wafer on a few layers of Kimwipes or lint-free cloths, so that it has a little cushioning.
2. Using a scribe or an X-acto knife, chip the edge of the wafer by pressing down firmly. the wafer will crack in a relatively straight line. (See Figures 1 & 2)



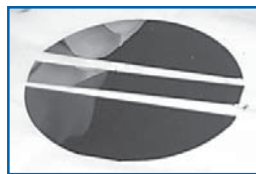
- Figure 1 -



- Figure 2 -



- Figure 3 -



- Figure 4 -

3. Now, chip it again at the width that you want your samples to be. About 1/2" is a good size for most sample holders. (See Figures 3 & 4)



- Figure 5 -

4. Next, turn the strip that you have just broken sideways and chip it in 1/2" increments. (See Figure 5)



- Figure 6 -

5. This produces square SiO₂ samples, ready to be mounted (shiny side up) on your sample mount and used to calculate your ion gun sputter rate. (See Figure 6)

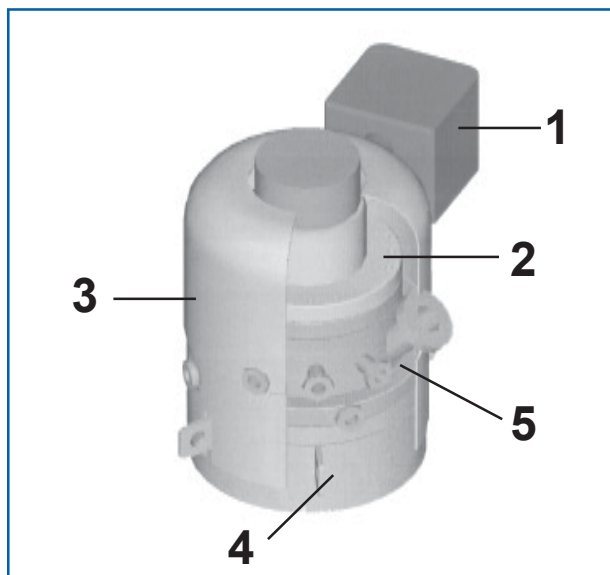
RBD New Services

Smaller Beam Diameters For PHI 595, 600, and 660 Systems

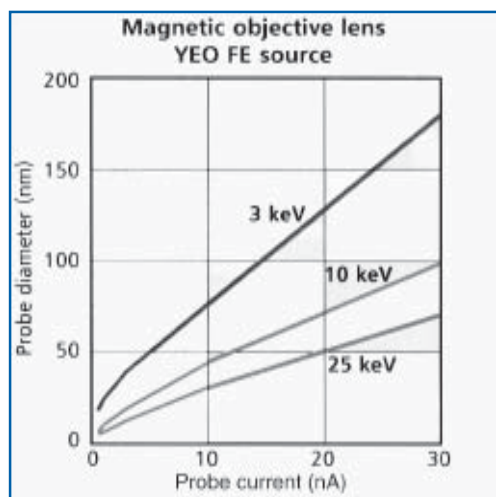
Auger microprobes such as the PHI 595 and 600 series can now benefit from a Schottky field emission upgrade package from York Electron Optics Ltd. installed by RBD Enterprises. Schottky field emission sources are now exclusively used in "state-of-the-art" instruments from the leading suppliers. This technology is now available in a form suitable for use with older instruments.

The benefits to the user are: a 20-fold increase in the available current at 100nm resolutions relative to LaB₆; very stable beam currents; and, excellent low energy imaging performance.

- ◆ 10nA into 100nm at 10keV
- ◆ 1nA into 100nm at 3keV
- ◆ <1% beam current drift per hour
- ◆ 0.5 - 25keV operation
- ◆ 100nA maximum probe current



The CAD image on the left shows the general arrangement for upgrading a PHI 600 or 660 instrument. The new configuration includes an ion pump (1), a vacuum envelope (2), mu-metal shielding (3), all fitted to the existing specimen chamber (4) and a CMA optics flange (5).



The above diagram shows the theoretical performance of the system. This shows that the excellent probe diameter performance normally associated with new instruments is achievable with the upgrade. At 3keV this upgrade challenges the performance of the established suppliers of new instruments.

The supporting electronics allows the system to be seamlessly interfaced to the existing computer hardware thus making the transition from Lab6 to Schottky field emission very straightforward.

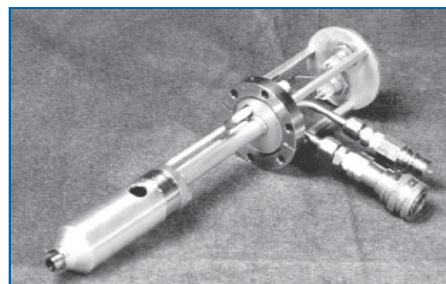
Call, fax, or email Dr. Stewart Bean at York Electron Optics Ltd. with questions or to request a quote. His phone: +44 1904.432278; Fax +44 1904.432214; E-mail address: sb40@york.ac.uk. RBD will be available for installations in the USA.

Refurbished Components

The used items listed below have all been refurbished to original specifications. All optics include a one-year warranty, and all electronics include a 90-day warranty. A one-year warranty for electronic units is available for a nominal charge. Please call for more information on any of these units, or if you need help locating an item not listed.

Refurbished Optics

<u>Model Number</u>	<u>Description</u>	<u>Price</u>
04-151	10kV X-ray Source	\$1,800.00
04-161	2kV Sputter Gun	\$1,500.00
04-300	4kV Ion Gun	\$4,500.00
04-500	15kV X-ray Source	\$7,500.00
10-320	Specimen Stage	\$5,000.00
11-05	Photon Counter	\$500.00
15-635	Sample Parking Attachment	\$5,000.00
15-610	Specimen stage, 8" flange, holds 12 samples	\$750.00
5100	XPS Bell Jar	\$1,500.00
550	Bell Jar	\$850.00



04-151 10kV X-ray Source

Refurbished Electronics

<u>Model</u>	<u>Description</u>	<u>Price</u>
11-010	5kV Electron Gun Control	\$3,250.00



11-010 5kV Electron Gun Control

11-045	Electron Gun Control	\$2,750.00
11-500	AES System Control	\$2,850.00
14-040	DC Power Supply	\$3,000.00
16-020	Heat Exchanger	\$2,800.00
18-030	Interlock	\$500.00
18-040	10kV X-ray H/V Supply	\$1,000.00
18-075	Scanning System Control	\$100.00
20-028	Specimen Heater	\$1,000.00
20-055	Multiplex Control	\$150.00
20-070	Scanning System Control	\$2,300.00
20-075	Electron Multiplier Supply (XPS and AES)	\$500.00
20-620	Gun Control	\$6,800.00
20-805	AES/ESCA Analyzer Control	\$2250.00
32-020	Detection Mode Control	\$50.00
32-095	X-ray Source Control	\$3,200.00
32-060	System Mode Control	\$100.00
604	Tektronix Monitor	\$250.00
606B	Tektronix Monitor	\$500.00
80-360	Analyzer Control	\$12,000.00

Refurbished Components

Refurbished Analyzers

These analyzers have been refurbished to original specifications and include a one-year warranty.

<u>Model Number</u>	<u>Description</u>	<u>Price</u>
15-255G	Doublepass XPS/AES analyzer, mounts on 8" flange. New Channeltron electron multiplier; 2 available	\$12,750.00
10-155	Thin film AES analyzer, mounts on 6" flange; New Channeltron electron multiplier	\$6,800.00
10-360	XPS Analyzer	\$25,000.00
15-110	SAM Analyzer	\$5,500.00

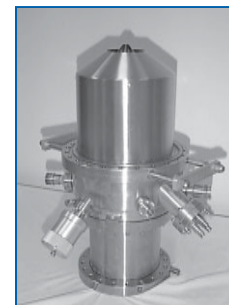


15-255G Analyzer



15-110 SAM Analyzer

25-120	PHI 595/600 Analyzer - 10" flange AES Scanning analyzer; 500Å beam size.	\$10,000.00
25-110	Super SAM Analyzer	\$7,500.00
25-260	Large Double-pass Analyzer	\$10,000.00



25-120 Scanning Analyzer

Refurbished Systems

Please call RBD for more information on the systems listed below.

<u>Model Number</u>	<u>Description</u>
PHI 5400	ESCA Small Spot XPS System
PHI 5600	Multi Technique System
PHI 670	Scanning Auger Microprobe System
PHI 660	Scanning Auger Microprobe System
PHI 570	ESCA/Auger System
SSX-100	Small Spot XPS System

WANTED

- ◆ Used C75-010 Filament Bases
- ◆ Used 04-548 & 04-500 X-ray Anodes
- ◆ Used 04-303 Ionizer bases
- ◆ Empty Argon & O₂ Bottles - 25cc & 50cc
- ◆ Please call us if you have any used or refurbished components or systems that you would be interested in selling.

RBD In-House Repair

- In-House Repair Expands - Special on 04-303 Ion Gun Complete Rebuilds

Curtis Dearing recently joined our in-house repair staff as an optics repair technician. With the addition of Curtis, RBD is now expanding into more into VG and Kratos optics repairs, as well as offering more specials on PHI repairs. To kick off this department's expansion, we are offering a special for a complete rebuild of the 04-303 ion gun.

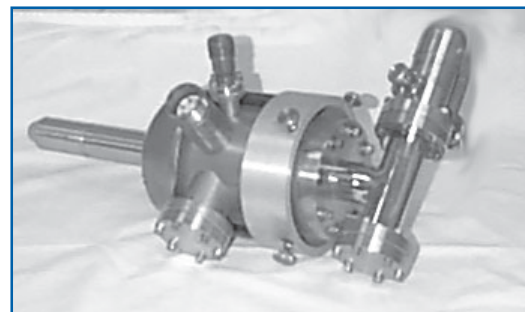


Over a period of years, the 04-303 ion gun will develop deposits and flakes inside the gun, which result in arcing at higher beam voltages and unstable operation. When this occurs, the best solution is a complete rebuild of the ion gun. This procedure entails completely disassembling the ion gun and cleaning all parts. Any metalization on ceramics is removed and the parts are all cleaned, baked, and reassembled. The ion gun is then placed in a UHV chamber and is out-gassed and conditioned to maximum voltage. When you get the gun back, it is like it was

when it was brand new and your arcing problems will be gone.

Our special offer includes cleaning, a complete ionizer rebuild, and UHV burn-in for only \$1,295.00. A loaner 04-303 ion gun is available for a flat rate of \$145.00. This offer is good for all 04-303 rebuilds scheduled between now and December 31, 1999.

To schedule your 04-303 complete ion gun rebuild or talk about your VG or Kratos service needs, call us at 541.330.0723 and speak with Curtis Dearing at extension 307.



04-303 Ion Gun

New Repair Items

RBD has added the following units to our ever-growing list of items that we repair. If you have an electronics unit, optics unit, or filament assembly from any type of surface analysis equipment that you are having trouble getting serviced, please give us a call and we may be able to help.

New Electronics Unit Repairs

PHI 18-600 Quadrupole Control - This is the control unit used on the PHI SIMS II systems. It is actually a Balzers QMS 511 Quad Control Unit.

3M Ion Gun Control - This ion gun control is used on old 3M SIMS systems, as well as many Kratos XPS systems.

New Filament Rebuild

X-ray filament refurbishment for Phillips Trex 610T - For only \$125.00, we will clean the old filament base, install a new filament, and burn it in under UHV conditions. This is an excellent value when compared with the price of a new filament.

Argon Gas Bottle Refill

25cc and 50cc gas reservoirs filled with grade 5.5 argon after evacuation by turbomecular pump and baking. A copy of the purity certificate will be supplied with each refill. 25cc refill = \$175. 50cc refill = \$225



563 SW 13th St., Suite 201 Bend, OR 97702



04-303 Complete Ion Gun Rebuild

Special offer includes cleaning, complete ionizer rebuild, and
UHV burn-in for only \$1,295.00.

Company _____

Name _____

Phone/Fax _____

E-mail _____

This offer is good for all 04-303 ion gun complete rebuilds scheduled between now and December 31, 1999. Photocopies not accepted.

