

The Pacer Open Architecture Machine Control System

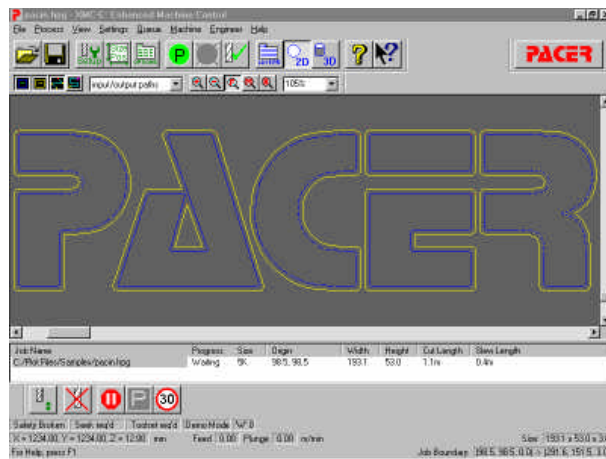
Total Flexibility for Ease of Operation and Maximum Productivity

Open Architecture is not a high tech marketing buzzword, it is an essential requirement for any productive and flexible manufacturing organisation. For CNC routing and engraving machines, which are used in a wide variety of industries for many different applications, an open control system allows easy integration into an existing environment and maximum versatility for future growth.

Pacer Systems has always developed its own machine control systems - even the very first Pacer, delivered in 1983 had its own in-house developed software and hardware. In those days it was quite rare to find customers already equipped with CAD software. For this reason Pacer supplied an integrated CAD system with all its CNC machines. At the time this was probably one of the most advanced and easy to use solutions available and led to many hundreds of machines being supplied all around the world.

Open Architecture

Over the years Pacer has always placed great emphasis on the software required for the control of its CNC machines. By keeping abreast of the latest technology, its latest open architecture XMC-E system is really easy to learn and operate yet is packed with powerful features for even the most demanding of applications.



Many new Pacer customers will already have a design system that they are happy and familiar with or they may have selected a system that is particularly suitable for their type of product. This CAD system may be located in a drawing office, away from the factory. It is therefore important that the CNC machine can:

1. Accept data from a wide variety of CAD systems
2. Retrieve the data via a number of different transfer mechanisms, e.g.: floppy disc, network, CD-Rom etc.

A solution that provides this level of choice to the user is a true open architecture solution. The Pacer XMC-E machine control system can do all of this. It accepts 2D design data in standard HPG, DXF or PLT formats, which is widely supported by all serious CAD, or drawing packages and runs on a standalone or a networked PC sited adjacent to the machine. For 3D work XMC-E imports industry standard g-code data.

The role of the XMC-E software is twofold - it first has to generate the cutter path and then it has to send this data to the machine, at the same time providing full control

over the machine actions. At its simplest, the cutter path generation will use the cutter diameter and automatically calculate an offset from the design so the machine will cut the part to the required dimensions. There are however a lot of other considerations to take into account when creating the cutter path. Some of these are handled fully automatically such as the ordering of contours so that inner ones are cut before outer ones. Many other cutting parameters can be set by the machine operator - some of these are as follows:

- **Automatic Rounding of Corners for Perfect Inlays:** All corners can be automatically rounded to the minimum possible radius compatible with the selected tool. This also works where different cutters are used for each part of the inlay.
- **Work Holding Tabs:** This is a particularly useful Pacer feature which enables small routed components to be held firmly in place until removal. Tabs can be located automatically with no operator intervention. This feature improves quality and productivity by eliminating the need for any clamps, jigs or workholding tape.
- **Multi-pass Cutting:** Tough or thick materials can be processed with ease by just entering the maximum cut depth to be used per pass.
- **Engraving Features:** include area fill algorithms to automatically generate contours within specified areas and step and repeat for multiple copies of the same job.
- **Layers:** this is a facility which allows different parts of a job to be cut with different machining parameters, e.g.: different offsets, different tools, different depths of cut etc.



Some CAD systems have facilities for generating cutter paths and will also have some of the above features. If such a system is in use then XMC-E can directly accept cutter path data from the CAD system.

Machine Control features are important for fast and efficient operation of the machine. These include:

- Queue jobs for cutting
- Start, Stop and Pause functions
- Vary feed and plunge rates during cutting

Based on Industry Standard Hardware and Software

The Pacer XMC-E software runs on a standard IBM compatible PC under Windows 95 or 98. By following standard Windows conventions users are able to find their way around the system with little or no training. The friendly graphical interface and familiar dialogue boxes mean that they can be cutting and engraving jobs as soon as the machine is unpacked and installed.

The use of a standard PC allows a choice of how the machine will be integrated within an existing production environment. If the design station is remote from the machine then the machine control PC can be fitted with a network card for fast and easy downloading of jobs. Alternatively, a whole range of other file transfer media could be used including floppy disc, CD-Rom, optical disc, tape etc. If the machine control computer is to be used as the design station as well then any Windows based CAD or drawing package can be installed to run alongside the XMC-E.

Single Source Supply

Pacer Systems is probably the only supplier of CNC routing and engraving machines who design all the machines, build the control systems and develop the machine control software themselves. This means that Pacer have total control over all developments. This is also of great benefit to the customer as it means that they have only a single source of supply. If a problem were to develop with the machine, whether in the software, controller of the machine itself then the Pacer engineers can very quickly pinpoint the cause and provide a solution. There is no reliance on third party suppliers which could result in a fault being passed from supplier to supplier whilst the customer suffers.