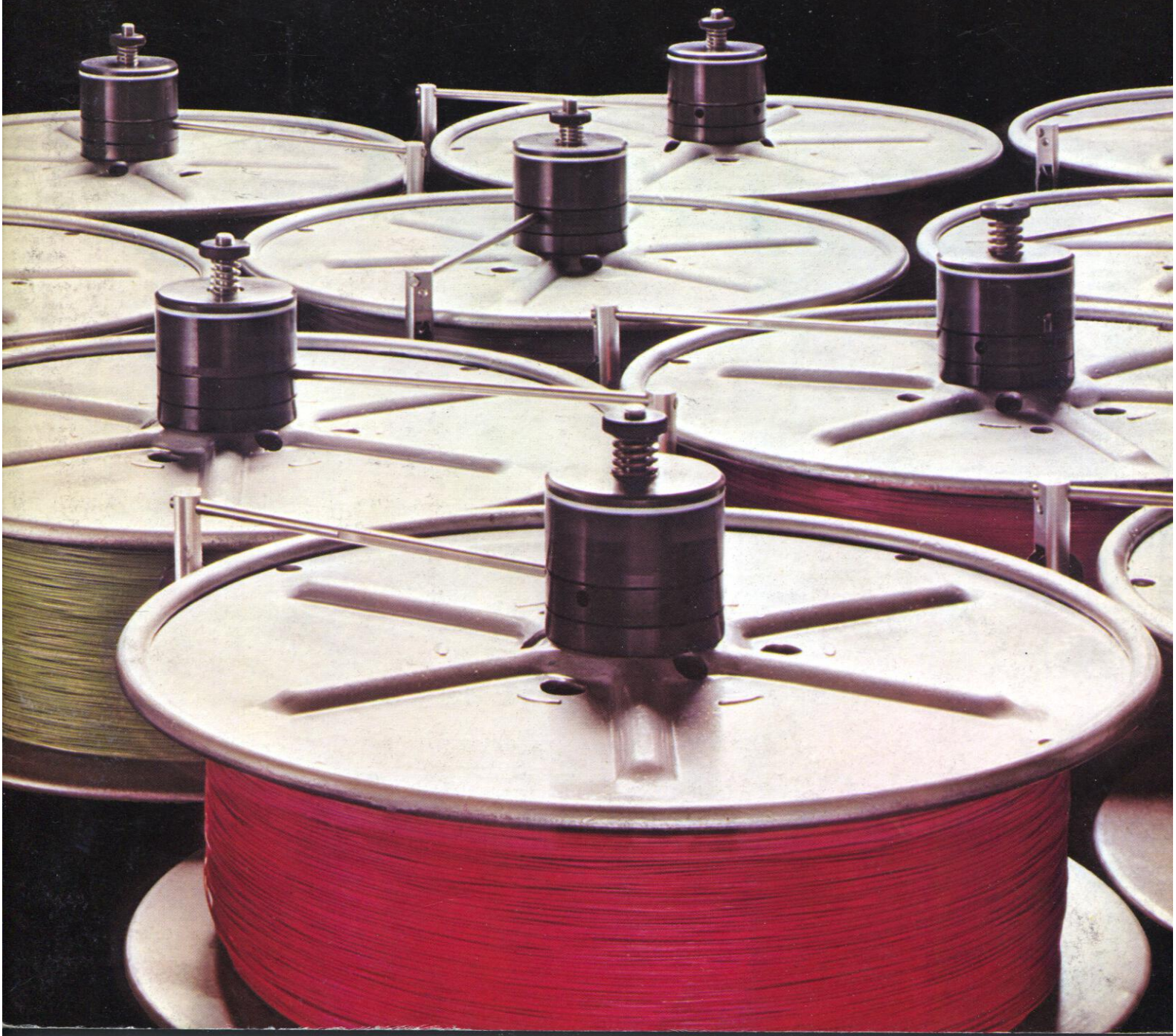
Xynetics WireMatic II Automatic Cable-Forming System



Turning thousands of feet of wires into properly-assembled cables and electronic harnesses has always been one of the most difficult production steps facing firms manufacturing and servicing sophisticated equipment and systems.

The work is time-consuming and tedious, costly and complex. It is also critical to a product's ability to function as promised, for as long as promised.

And the tangled web to be weaved has often caused many a dollar to go for naught that otherwise would have gone to profits.

Introducing WireMatic II. A unique system for turning a jungle of strands into a perfectly-knit network of electronics. A means to reduce labor while increasing labor's productivity. A way for firms—like yours—to move thousands of dollars out of cost-of-goods, straight to bottom line.

Xynetics' WireMatic II Automatic Cable Forming System. The next few pages will give you the proof of the promises offered here.

WireMatic II was conceived, designed, engineered, and manufactured with but a single purpose:

To make cable and harness forming simpler, easier, less expensive.

It is meant for a countless variety of companies—in telecommunications, computers and peripherals, aircraft and avionics, automotive, appliances, power tools—virtually anywhere electronics are used in producing a product or system.

WireMatic II will handle a diverse number of cable and harness configurations, is simple to operate, makes efficient use of floor-space, and is easy-to-maintain.

The 800 hour work week

WireMatic II lays wire at speeds up to 40 inches per second per axis—10 to 20 times faster than hand assembly. It automatically selects the proper wire, threads, lays, cuts, and returns to start again. Test times are reduced by 40% or more. And since each cable is identical, rework is virtually eliminated.

WireMatic II saves you even more time in forming board preparation—up to 80%. It determines pin locations and then pre-drills the holes for pin placement.

WireMatic II will dramatically increase your productivity, enabling a 40-hour week worker to produce significantly more—up to the equivalent of 800 hours weekly.

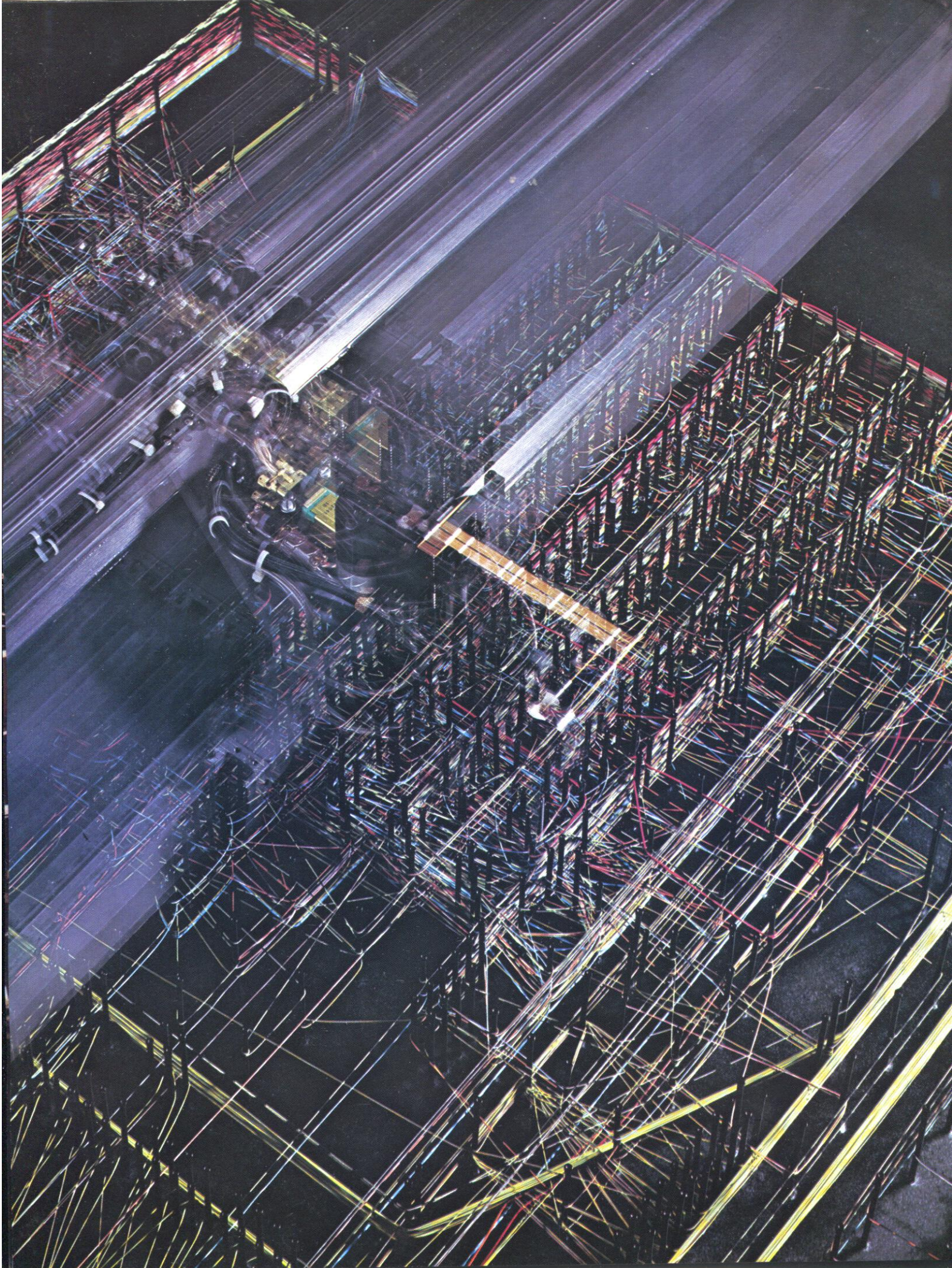
Easy to operate

So easy, in fact, one operator can run three WireMatics simultaneously. With minimal training your employees will be running WireMatic II at full capacity.

All functions of the WireMatic II are managed via the controller, paper tape input, video display/keyboard console, and operator control panel.

No need for computer programming—the software package is included.

Each cable or harness forming procedure is optimized for proper function, speed of assembly, and best use of wire.



The video display/keyboard provides all necessary operating data including function selection and sequence, part numbers, part usage—even fault-analyses, such as snags, breaks, overtension, collision and wire shortages.

Facilities are provided to enable an operator to make changes, corrections, additions, deletions in a program, as needed—when needed. Additionally, WireMatic II features a coded entry procedure, thus restricting access, protecting valuable programs and data.

At the conclusion of a forming run, starting another run is simply a matter of putting a new flexible disc in the controller.

Then you're off and running.

No wear on parts

Xynetic's employs its patented linear reluctance motors on the WireMatic II.

This ingenious use of magnetic force produces motion on a cushion of air. You get movement along any vector with no pulleys, belts, lead screws, gear trains, or any other mechanical devices.

It all adds up to no friction, less wear, and minimized breakdown and replacement costs.

Some amazing details

WireMatic II handles up to 100 wires from 10 to 30 gauge. It'll handle single wire, twisted strands of 2 to 3 wires, multiple conductors, and a variety of shielded or coaxial conductors.

The standard table will accept a forming board from 2′ x 3′ to 6′ x 10′. Other tables are available to accept forming boards as large as 7′ x 14′. WireMatic II can lay large complex cables or several small cables on the same board. Yet WireMatic II takes up less space than 5 of your present workers, while doing up to 8 to 10 times the work per shift.

Payback in seven months

The most obvious cost-benefit to WireMatic II is the dramatic labor-savings possible, via the dramatic increase in employee productivity. But there are other cost-savings—the most accurate, and faster forming board preparation. The greater control over wire usage. The reduction in necessary testing, and the minimization of re-work.

How much could WireMatic II save you? Take a look.

The charts on the right reflect the results of an actual justification study made in a plant manually producing a variety of cables for the electronics industry.

First year projections show forming operator costs cut by an incredible 95%. Forming board preparation costs, turnover and training costs, test costs and inventory costs were all reduced dramatically.

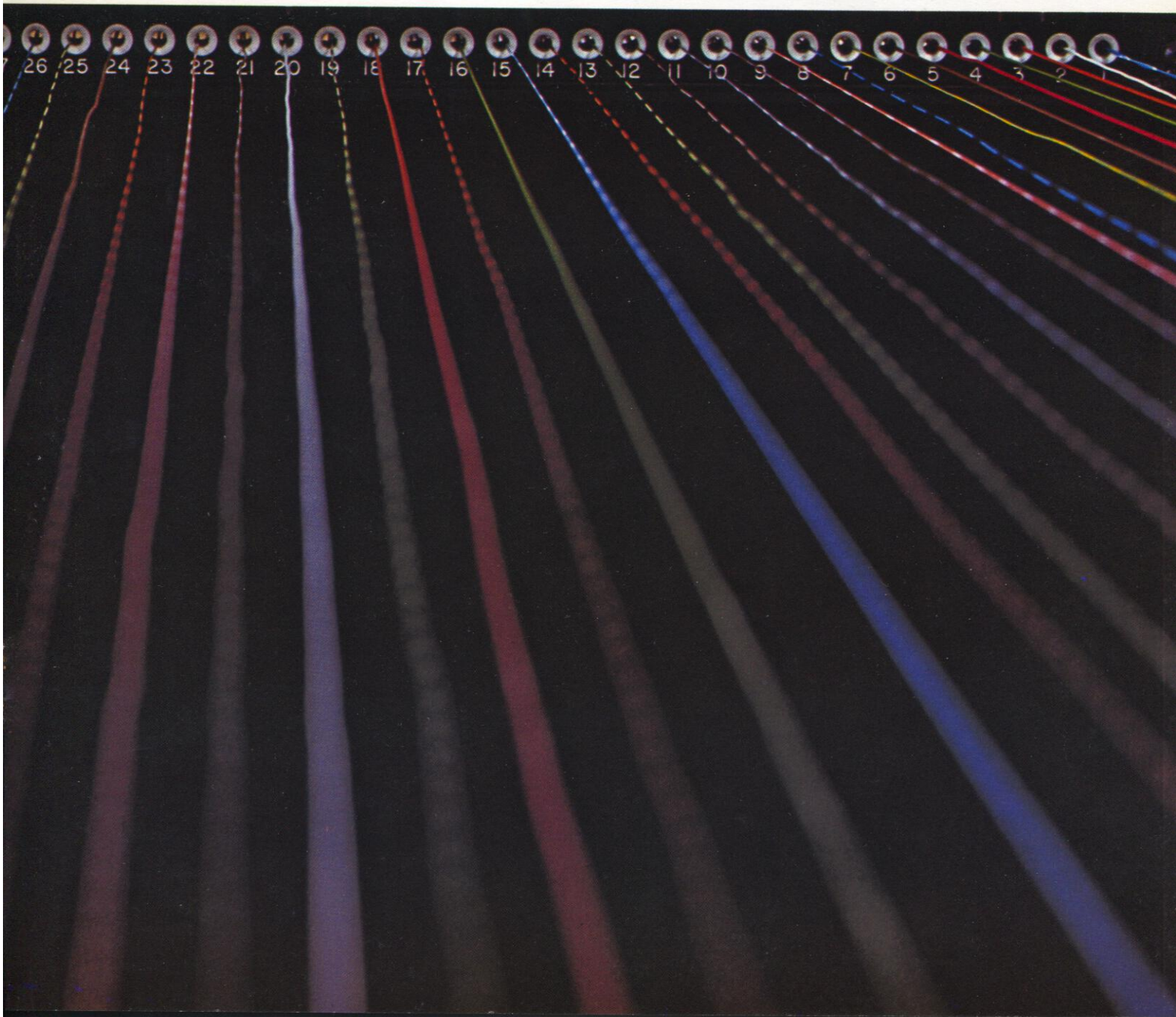
The company in the cost study showed a first year saving of $355,356—a 56% saving over manual forming.

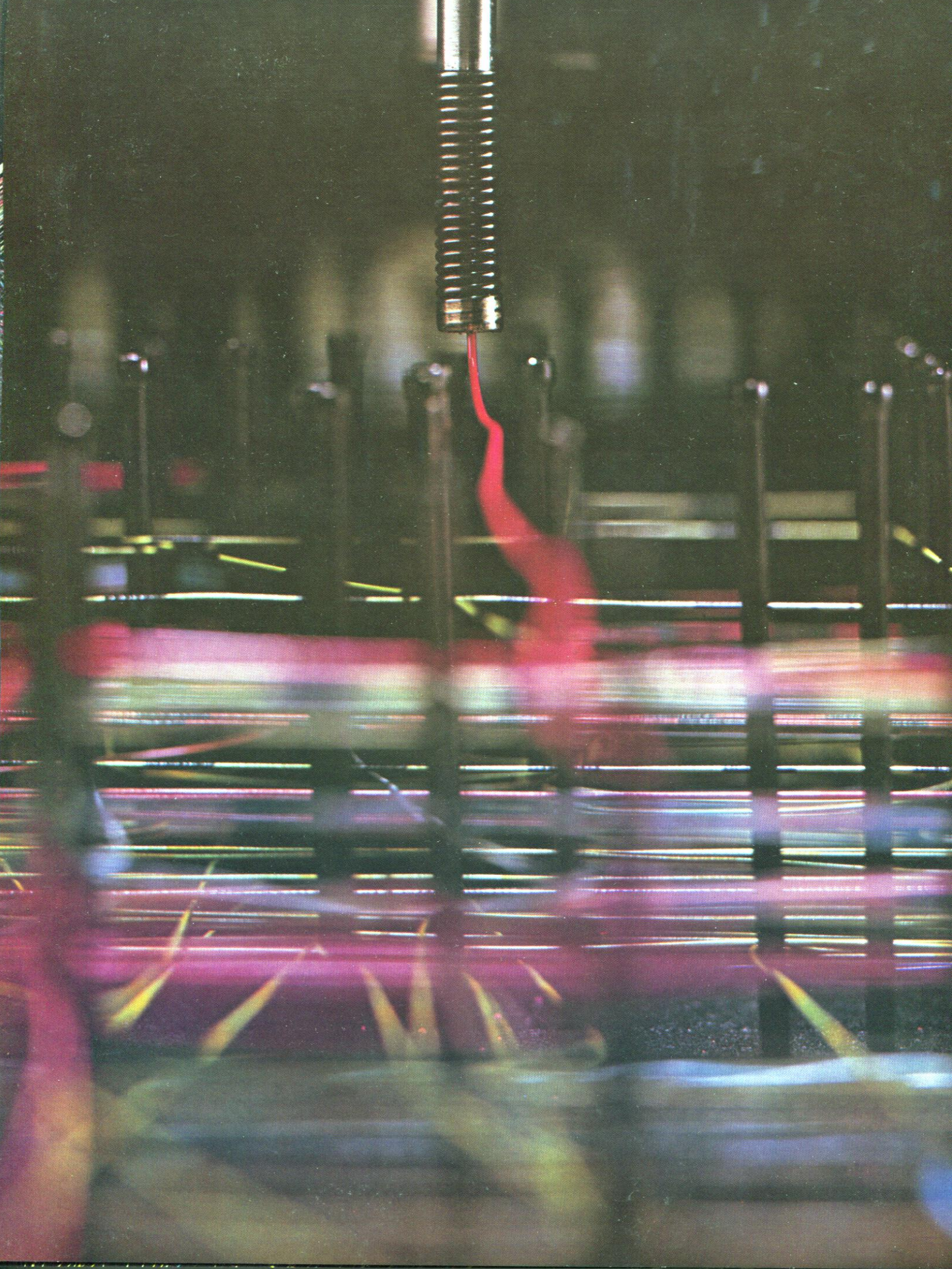
The return on investment calculated by the discounted cash flow method was over 100%. And the simple payback period was seven months.

WireMatic II—it's built to increase productivity, cut costs, achieve substantial savings. It could do the same for you.

Cost Factor	Annual Cost	
	Manual*	WireMatic II
Operator cost forming	$245,104	$ 10,595
Rework of forming errors	11,763	-0-
Lacing	245,104	223,997
Costs to test dept., cable forming errors	14,509	-0-
Manufacturing space	7,036	1,440
Turnover and training	2,620	-0-
Manufacturing documentation generation	78,221	31,288
Forming board preparation	15,644	3,128
Inventory reduction costs generated by WireMatic II	5,803	-0-
Total Annual Costs	$625,804	$270,448
Annual Cost Saving by WireMatic II		$355,356

* Based on 21 cable forming operators, unburdened labor. Operator rate including fringe, $5.83/hr.





Wirematic II software and control system

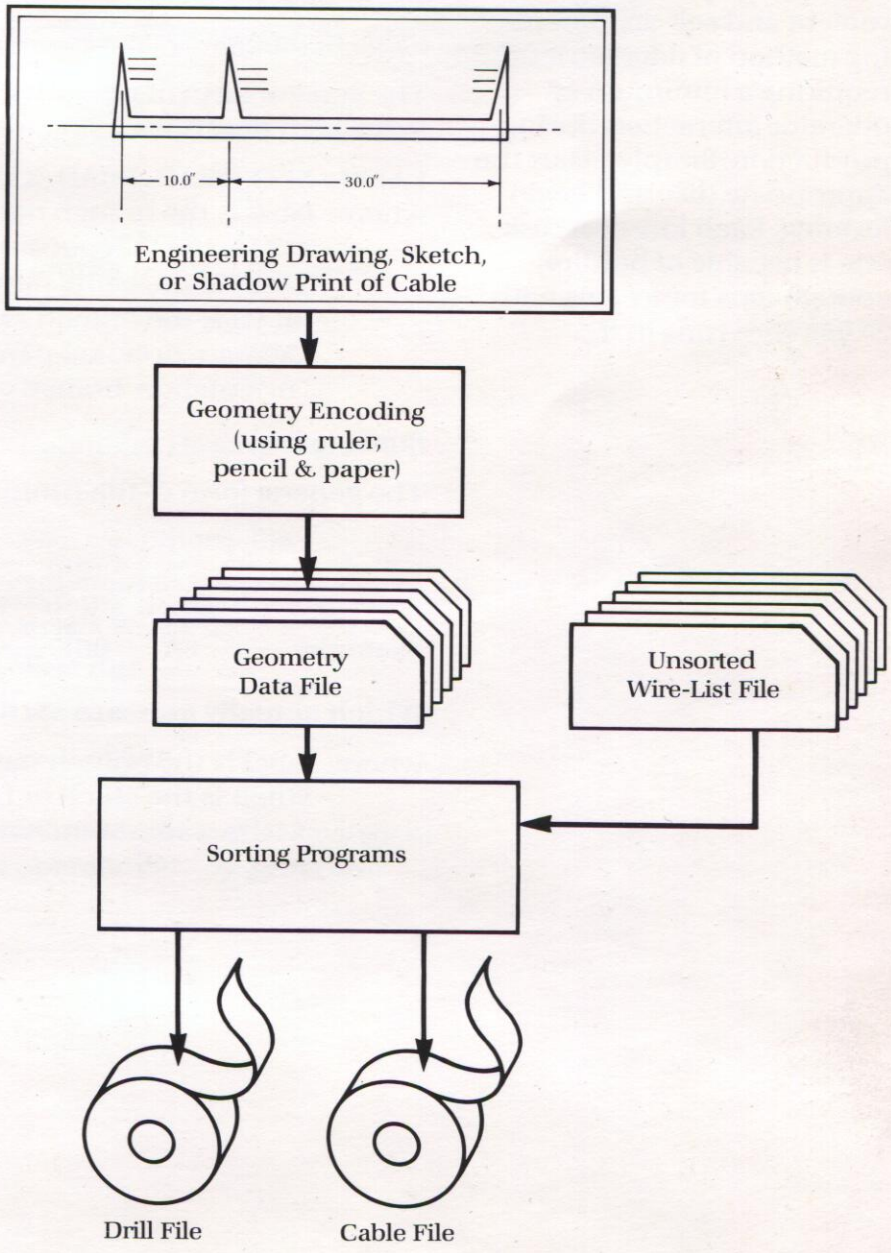
Designed for easy data input—no programming required,—simple, straight forward, X and Y coordinate information is input to describe the centerline geometry of the cable or harness. Next, the engineering from-to wire list is input in one of several formats (most likely one of them is what you are using now). The rest is up to the software packages supplied with the system. The optimized wire running files for cable forming and the drill files for drilling pilot holes for placement forming pins in the board are output. You are ready to form cables in minutes.

The software system

The WireMatic II control system is based on a powerful foreground-background flexible disc operating system. This system is contained in a 16k minicomputer complete with text editor, assembler, Fortran IV compiler, system and scientific libraries, and loader. The system software is designed to provide maximum flexibility in the layout and data preparation phases while eliminating costly and cumbersome numerical control type programming.

Data preparation

A variety of packages, each written in machine-independent Fortran IV are also available to assist the user in the initial sorting and optimization of raw input data. These programs are specifically designed to take advantage of the resources of large-scale computing systems and yet still operate within the limited storage environment of the WireMatic II if desired. Each package is modularly written for easy adaptation to your engineering wire list formats. The packages produce optimized files for board drilling and cable forming. The sequence operations for data preparation are as shown in the following diagram.



Loading the data into the controller

The drill and forming files which were output from the sorting program are loaded onto flexible disc via paper tape, magnetic tape or card deck and become part of a permanent library of forming data from which all production runs are made. The inherent modularity of flexible disc storage provides a convenient and self documenting method of data retrieval requiring a minimum of operator interaction during production. Simply insert the appropriate disc and begin forming. Each low cost diskette is capable of holding enough data for a cable with 25,000 wire runs in it.

Input data

The input file for the WireMatic II consists of a set of geometric descriptors which define the shape and placement of the harness on the forming board and a "from-to" running list similar to a typical engineering wire list. Since the file is coded in simple alpha numeric text format, any modifications to the data file can be done right at the WireMatic II using the powerful text editor. Engineering changes, modifications, and corrections can all be easily incorporated right at the operator console.

Input data format

Cable Geometry

The general form of geometry description is a simple line of text which describes a single branch or sub-branch of the form:

LABEL: XCO, TRAD, BRAD, XXXX, XXXX
where: label is the branch name
XCO is the "X" coordinate
TRAD is the trunk radius
BRAD is the branch radius
XXXX are optional parameters describing angular orientation, branch offsets and other data as required.

Running list

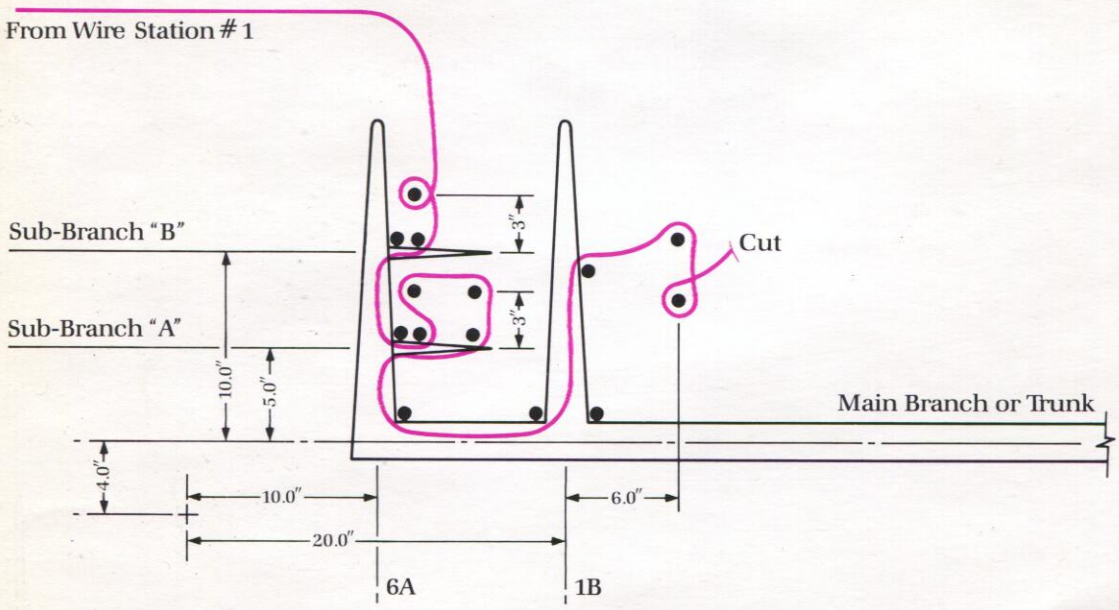
The general form of the running list is:

	From			To		
	label	stitch	tag	label	stitch	tag
example:	6A	001	B	6A	005	

Which actually appears as: 6A001B, 6A005

where: label is the branch name
stitch is the stitch or breakout designator
TAG is a sub-branch name if required

Example of coding a typical cable



A typical coding of two wire runs for the portion of a cable shown in the figure above would be:

G90:	Open Geometry file
6A: 10.0, .5, .25, U, E, 6.0 A, 5.0, .25, .25, E, N, 3.0 B, 10.0, .25, .25, E, N, 3.0 1B: 20.0, 1.0, .25, U, E, 6.0	Geometry Descriptions
$	Close geometry file
M68, 4.0	set main trunk position
M06, 001	select wire # 1
6A 001B, 6A 001A	first run
6A005A, 1B 023	second run
$	end of file

The WireMatic II—it'll help you achieve substantial savings in your cable and harness forming operations—by Xynetics.

WireMatic II Specifications

Overall dimensions	L	W	Ht.	Wt.
Table (6 x 10 standard)	154″	90.5″	*	2,500 lbs.
Electronic Console	46″	30″	53″	700 lbs.
Desk & Video Display	36″	26″	36″	75 lbs.

* Height from floor to forming board level = 25″
Height from floor to top of side guard = 35.5″
Height from floor to top of capstan/wire feed assembly = 84″

Forming board tables:

table size	max. forming area
6 x 10	66″ x 120″
6 x 12	66″ x 144″
6 x 14	66″ x 168″
7 x 10	78″ x 120″
7 x 12	78″ x 144″
7 x 14	78″ x 168″

(Other forming board table sizes quoted on request)

Wire capacity:
Up to 100 wire stations holding a variety of colors and gauges.

Wire gauges:
Light: 18 ga. through 30 ga.
Medium: 14 ga. through 22 ga.
Heavy: 10 ga. through 18 ga.

XY axis performance:
Velocity: Up to 40 ips per axis (24 ga. wire)
Accuracy: ± 0.010″
Repeatability: 0.001″
Resolution: 0.010″

Z axis performance:
Travel: 4″ standard. (Greater travel optional.)
Resolution: 0.010″
Velocity: 1.5 ips

Manual controls:
X, Y, and Z movement
On, Off
Auto/Manual mode select
Run/Stop
Forming Board align.
Re-zero

Controller:
Minicomputer
Dual Floppy Disc and Disc operating System
Hi-speed paper tape reader for data input and diagnostics
Video display and keyboard
Magnetic tape (optional)
Hard copy printer (optional)

Power requirements:
A. 1-phase, 115 v., 5 amps
B. 3-phase, 5 wire, 120/208 v, 15 amps per phase

Air requirements:
Compressed air, 15 SCFM @ 100 psi
Oil Free, Max dew point: 40° F

Environment:
Temperature: 60° F to 100° F
Humidity: 20% to 80% relative
Heat dissipation: 10,000 Btu/hr.

For more details on WireMatic II, or for information on other Xynetics products, write or call Xynetics Inc., 2901 Coronado Drive, Santa Clara, California 95051, telephone: (408) 246-6500. Or contact your nearest Xynetics representative.

Eastern U.S.
Xynetics Inc.
550 Pine Town Rd.
Fort Washington, PA 19034
(215) 628-3393

Western U.S.
Xynetics Inc.
2901 Coronado Drive
Santa Clara, California 95051
(408) 246-6500

Europe
Intertrade Scientific Inc.
Middlesex, England
Tel: West Drayton 45128

Intertrade Scientific Inc.
Munich, Germany
Tel: (089) 883657

Intertrade Scientific Inc.
Brussels, Belgium
Tel: 344-48-53

Intertrade Scientific Inc.
Rungis (Paris), France
Tel: 686/7986 or 7988

XYNETICS INC.
Xynetics Inc., 2901 Coronado Drive,
Santa Clara, California 95051
Telephone: (408) 246-6500