

# Fabs of the Southwest

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Semiconductor wafer fab activity in the United States was bi-coastal in the early days. Such firms as IBM and AT&T dominated the East coast while Fairchild and National Semiconductor dominated the West Coast. Wafer fab activity then blossomed in Northern California, which eventually became the nation's center of wafer fabrication. Today, leadership has moved to the southwestern states of Texas, Arizona, and New Mexico. This was stimulated by the growth of such local companies as Texas Instruments and Motorola, along with the migration of many California companies. (For this report, we have also included activity in Utah and Colorado.)

## Moving East

Texas has supplanted California as the leading silicon wafer fab state, with a consumption capacity of approximately 600,000 wafers per month. Fabs in Arizona can process roughly 350,000 wafers per month. New Mexico IC companies follow with a capacity of 91,000 wafers per month.

The leading fabricators in the Southwest are:

- Motorola
- Texas Instruments
- Intel
- National Semiconductor
- SGS-Thomson
- Advanced Micro Devices
- Philips-Signetics
- Teccor
- Sony
- Cypress Semiconductor

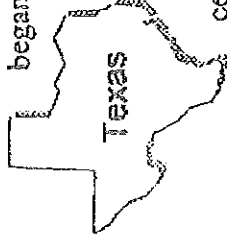
## DALLAS

Dallas and several neighboring communities comprise the largest focus of fab activity in the state. Texas Instruments, the largest manufacturer, is joined by Hitachi, Teccor, National Semiconductor, SGS-Thomson, Optek, Dallas Semiconductor and Microsemi.

At its Dallas complex, Texas Instruments has several large MOS fabs. Fabs DMOS 2, DMOS 3 and DMOS 4 consume six-inch wafers. The new DMOS 5 facility under construction will process eight-inch wafers for large-scale MOS logic devices.

The National Semiconductor facility in Arlington houses the Fab 1 and Fab 2 operations. Fab 1

began production in 1985. Fab 2 was started in 1992 and is still being expanded. Both facilities consume six-inch wafers for



CMOS gate arrays, standard cells, local area network devices and advanced microcontrollers. National's Texas operation is the company's largest wafer fab facility worldwide.

In nearby Carrollton are the MOS fabs of Italian-French company SGS-Thomson. Acquired from Mostek, this facility now operates three fabs. Two of the original fabs utilize four-inch wafers. The newest fab processes six-inch wafers. All three fabs produce devices for the merchant market and do foundry work for several fabless microprocessor companies.

Optek's small bipolar facility is also located in Carrollton. This fab consumes four-inch wafers for discrete devices.

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Hitachi operates a six-inch wafer fab in Irving. The fab is estimated to consume 15,000 wafers per month producing DRAM memory devices. Also in Irving is the bipolar discrete fab of Teccor, which consumes some 25,000 three-inch float zone wafers per month.

Dallas Semiconductor is headquartered in North Dallas. This six-inch fab line uses MOS processes to produce memory devices. When their latest expansion is complete this year, it will have a capacity of 60,000 wafers per month.

#### AUSTIN

The selection of Austin as the site for Sematech has done a great deal to vitalize the semiconductor industry there. In addition to operating a small pilot wafer fab, Sematech provides technological assistance to a broad base of contributing clients. The largest IC manufacturers in Austin are Motorola Semiconductor and Advanced Micro Devices (AMD). Cypress Semiconductor operates a fab in nearby Round Rock.

Motorola has two facilities in Austin. Their first site, which opened in the 1970s, houses several older fabs and the newer MOS 8 line. Motorola's newest fab line, named MOS 13, is in the planning stages. MOS 13 is expected to consume eight-inch wafers in the production of MOS logic devices. Motorola's MOS 11 line, located at the Oak Hill site, is currently processing eight-inch wafers, and has an estimated capacity of 20,000 wafers per month.

Advanced Micro Devices has three fabs in Austin: Fab 10, Fab 14 and Fab 15. Fab 10 consumes 16,000 five-inch wafers per month, operating MOS processes. Fab 14 and Fab 15 also operate MOS processes and together consume 36,000 wafers per month.

AMD has also announced plans for Fab 25. It will process eight-inch wafers for the production

of advanced MOS logic devices. Capacity is anticipated to be 20,000 wafers per month.

Also near Austin is the Round Rock facility of Cypress Semiconductor. This MOS fab produces logic devices from six-inch wafers. Capacity is estimated at 25,000 wafers per month.

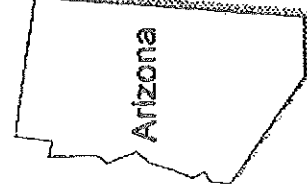
#### SAN ANTONIO

AMD was the first semiconductor company to operate in San Antonio, which is located 90 miles south of Austin. In 1990 AMD sold its two San Antonio fabs to Sony Microelectronics, which now operates the former AMD Fab 11. This bipolar facility processes five-inch wafers. A second Sony fab, the former AMD Fab 12, also produces MOS devices on six-inch wafers.

VLSI Technology is the other semiconductor facility in San Antonio. Their six-inch line produces MOS gate arrays and PC chip sets. Estimated capacity is 20,000 wafer per month.

There are several other wafer fab facilities located throughout Texas. Texas Instruments operates fabs in Houston, Lubbock and Sherman, in addition to its primary facilities in Dallas. The Lubbock and Houston fabs are believed to produce MOS devices, while the Sherman fab is a bipolar facility.

Finally, Semtech operates a wafer fab facility in Corpus Christi. Acquired from Lambda, it uses three- and four-inch wafers to produce bipolar discrete devices.



Arizona's primary cluster of semiconductor factories is in the greater Phoenix area, which includes Mesa, Scottsdale, Tempe and Chandler. Other wafer fabrication activity is taking place near Tucson. Motorola is the leading silicon wafer consuming company

In Arizona, Motorola has 13 fabs in Phoenix, Chandler and Mesa. They consume nearly 450,000 wafers per month, with diameters ranging from four to six inches. The Phoenix fabs run mostly bipolar processes producing power devices. The fabs at the Mesa complex run mostly MOS processes producing digital devices. In Chandler, Motorola is converting a fab previously known as Bipolar 6 into an MOS fab, slated to produce logic devices on eight-inch diameter wafers.

The second-largest wafer consumer in Arizona is Intel, which operates a wafer fabrication facility in Chandler. Known as Fab 6, it can process 25,000 six-inch wafers per month. Also in Chandler is a small fab owned by Microchip Technology. Acquired from General Instruments, it can consume 5,000 five-inch wafers per month. Microchip is currently in the process of converting this fab to process six-inch wafers.

Two fabs are located in Tempe. One is the former California Micro Devices fab acquired from GTE. This fab has an estimated capacity of 20,000 five-inch wafers per month. Also located in the Tempe is the Micro-rel fab, which was acquired from Meditronics. Its monthly capacity is 15,000 four-inch wafers. By the end of 1994, Landsdale Semiconductor is expected to move its California fab to Tempe. It will consume four-inch wafers using bipolar processes to produce digital devices.

Scottsdale is home to the Microsemi fab, which can consume 12,000 three-inch wafers per month. This fab runs a bipolar process producing discrete devices. The SGS-Thomson facility in Phoenix, which has the capacity to consume 3,000 six-inch wafers per month, is currently idle.

The Burr Brown fab facility is located near Tucson. It runs both bipolar and MOS processes, and can process 20,000 four-inch wafers per month.

All of the wafer fabs in New Mexico are located in the Albuquerque area. Both Allied Signal and

## New Mexico

Signetics have fabs in Albuquerque. Intel has a wafer fabrication center in nearby Rio Rancho. Intel is by far the largest producer in New Mexico, with three fabs and a fourth on the drawing board. Intel Fab 7, Fab 9.1 and Fab 9.2 are located at the Rio Rancho complex. Fab 11 is scheduled for completion in 1995.

Intel Fab 7 has the capacity to consume 25,000 six-inch epitaxial wafers per month. Fab 9 was constructed in two phases: Fab 9.1 and Fab 9.2. Together they have an estimated wafer start capacity of 50,000 six-inch epitaxial wafers per month. Intel's newest fabrication facility, Fab 11, is scheduled to come on line in 1995. It will have a wafer start capacity of 20,000 eight-inch wafers per month.

The two former Signetics fabs, now owned by Philips, consume mirror-polished Czochralski silicon wafers while the three Intel fabs consume Czochralski wafers coated with an epitaxial silicon layer. Fab 22 is a four-inch line and Fab 23 a five-inch line. Both fabs produce MOS devices. Combined estimated consumption is 40,000 wafers per month.

The Allied Signal facility is a pilot fab obtained in Allied's acquisition of Bendix. It is the only fab using four-inch wafers in New Mexico.

Fab activity in Colorado is also on the upswing. Both NCR (AT&T) and Hewlett-Packard have fabs in Fort Collins, north of Denver near the northern Colorado border. The NCR (AT&T) fab,

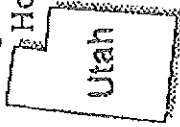
## Colorado

originally built in 1982, has been upgraded to process four- and six-inch wafers for MOS logic and memory devices. The HP facility, also in Fort Collins, produces MOS logic devices on four-inch wafers. Colorado Springs is another city with vigorous fab activity. An HP fab there produces MOS logic devices. NCR (AT&T) is upgrading its Colorado Springs fab to

a Class I facility which will produce eight-inch wafers. Also in Colorado Springs is the AMTEL fab, acquired in 1989 from Honeywell. It can fabricate devices with 0.8 micron geometries. This 80,000 square foot facility will have an additional 42,000 square feet on-line in late 1994. When completed, it will use 0.6 micron processes on six-inch wafers to produce logic and memory devices.

In addition to fabs in Arizona and California, Microsemi has a facility in Broomfield, Colo., north of Denver. It produces high-power discrete devices on both three- and four-inch wafers.

The growth of fab activity in Utah was set back by closing of the Philips-Signetics fabs in Orem.



However, National Semiconductor still operates a large fab in West Jordan, just south of Salt Lake City. This MOS facility makes logic products and is estimated to have a capacity of 30,000 four- and six-inch wafers per month.

### A Bright Future

The region's auspicious past bodes well for its future growth. There several new fabs being built or on the drawing board, many of them state-of-the-art facilities. All of this means large investments in plant and equipment. New fab facility announcements include:

#### Motorola

- MOS 12, Chandler, Arizona -- Conversion of the Bipolar 6 fab to an eight-inch site.
- MOS 13, Austin, Texas -- Eight-inch fab which will contain R&D facilities and manufacture advanced MOS logic devices.

#### Texas Instruments

- DMOS 5, Dallas, Texas -- 0.25 micron technology on eight-inch wafers. It is scheduled for completion in 1995.

#### Advanced Micro Devices

- Fab 25, Austin, Texas -- Will produce advanced MOS logic devices with a capacity exceeding 20,000 eight-inch wafers per week.

#### Intel

- Fab 11, Rio Rancho, New Mexico -- Eight-inch fab that will produce advanced microprocessors.

#### National Semiconductor

- Fab 2, Arlington, Texas -- Expansion of existing six-inch line.

#### NCR (AT&T)

- Colorado Springs, Colo. -- Eight-inch line with micro clean containers to provide a Class I clean room environment.

#### AMTEL

- Colorado Springs, Colo. -- Six-inch line for 0.6 micron MOS processes.



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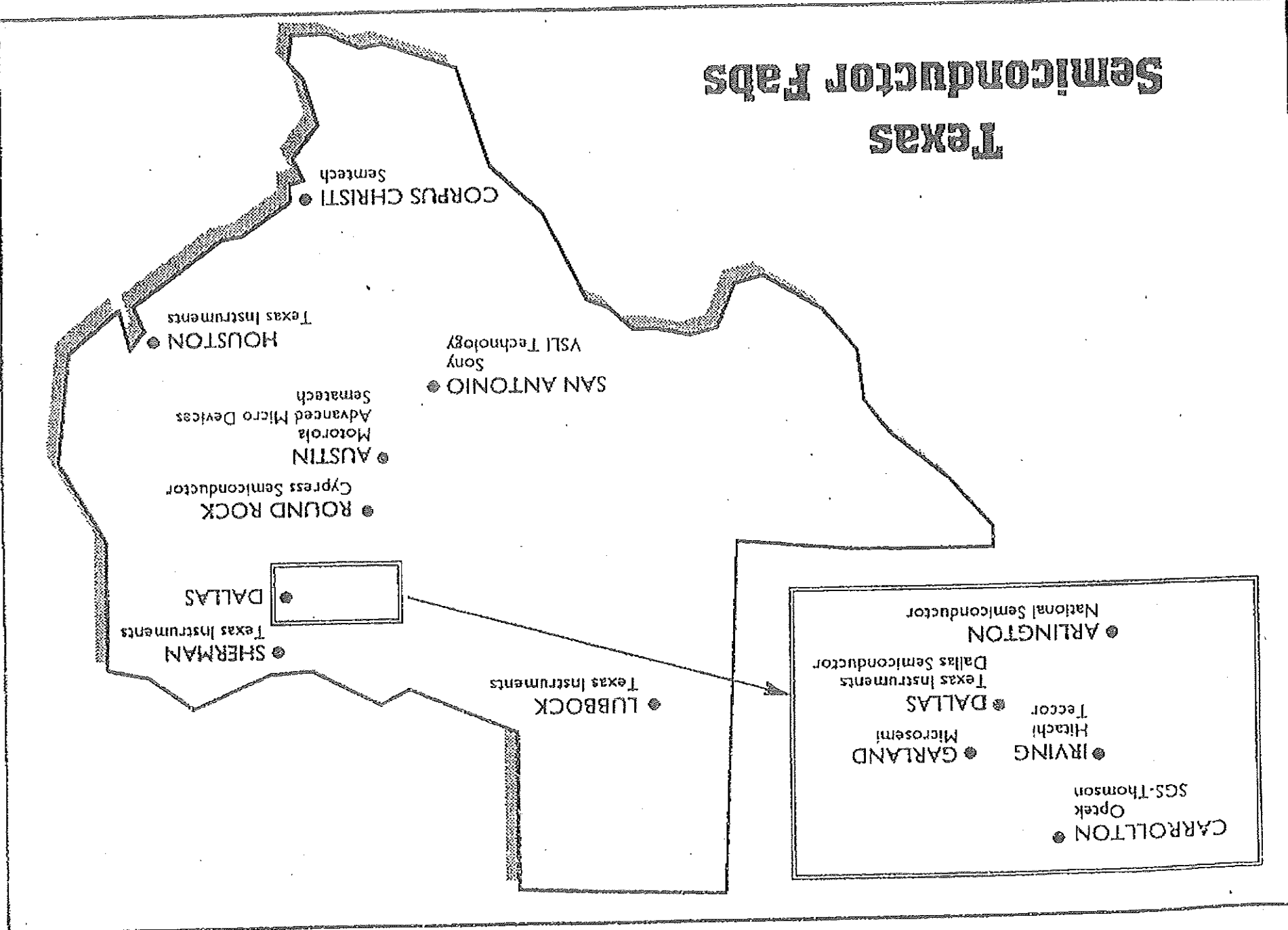
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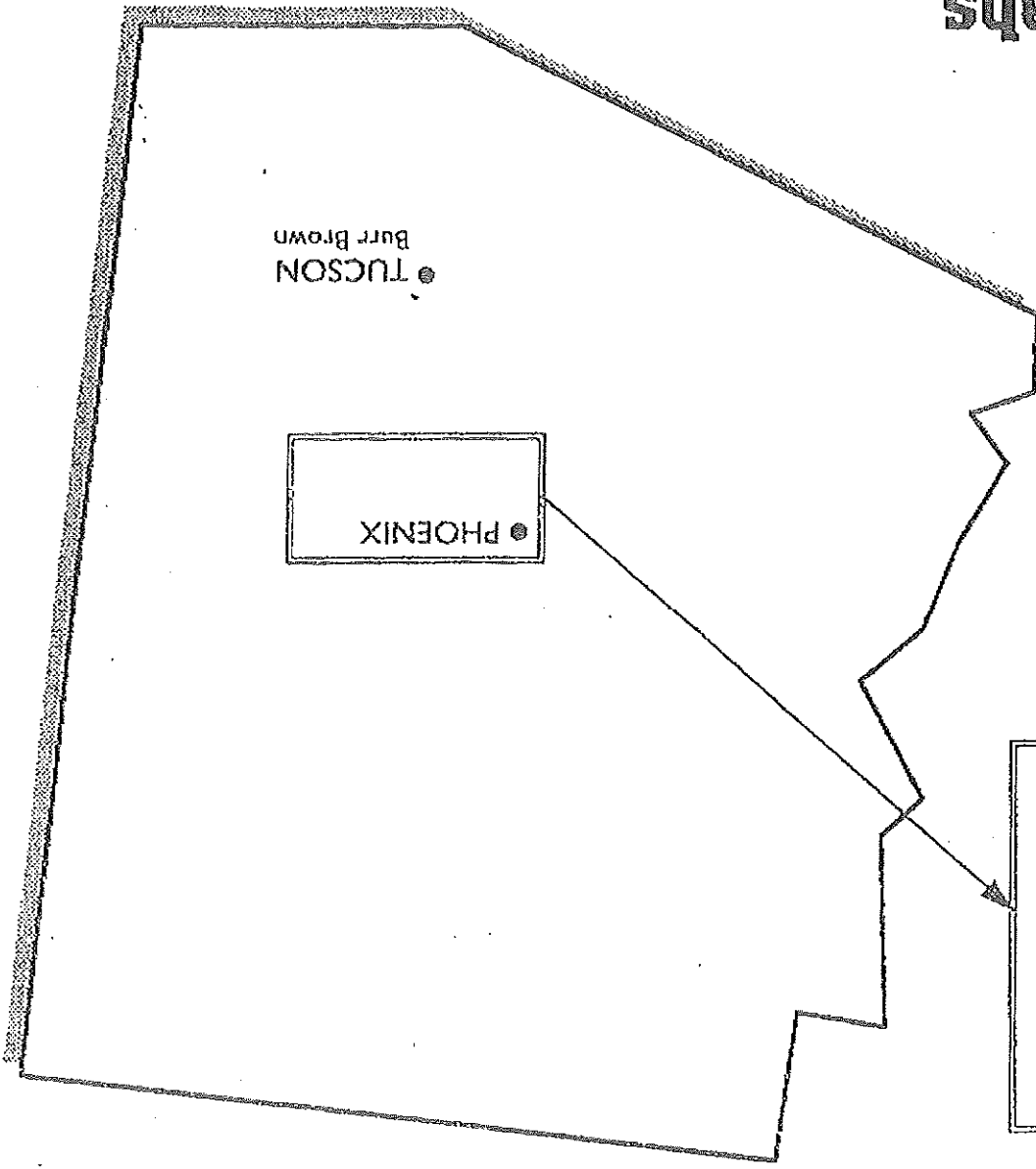
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# Texas Semiconductor Fabs



# Arizona Semiconductor Fabs



● TUCSON  
Burr Brown

● PHOENIX

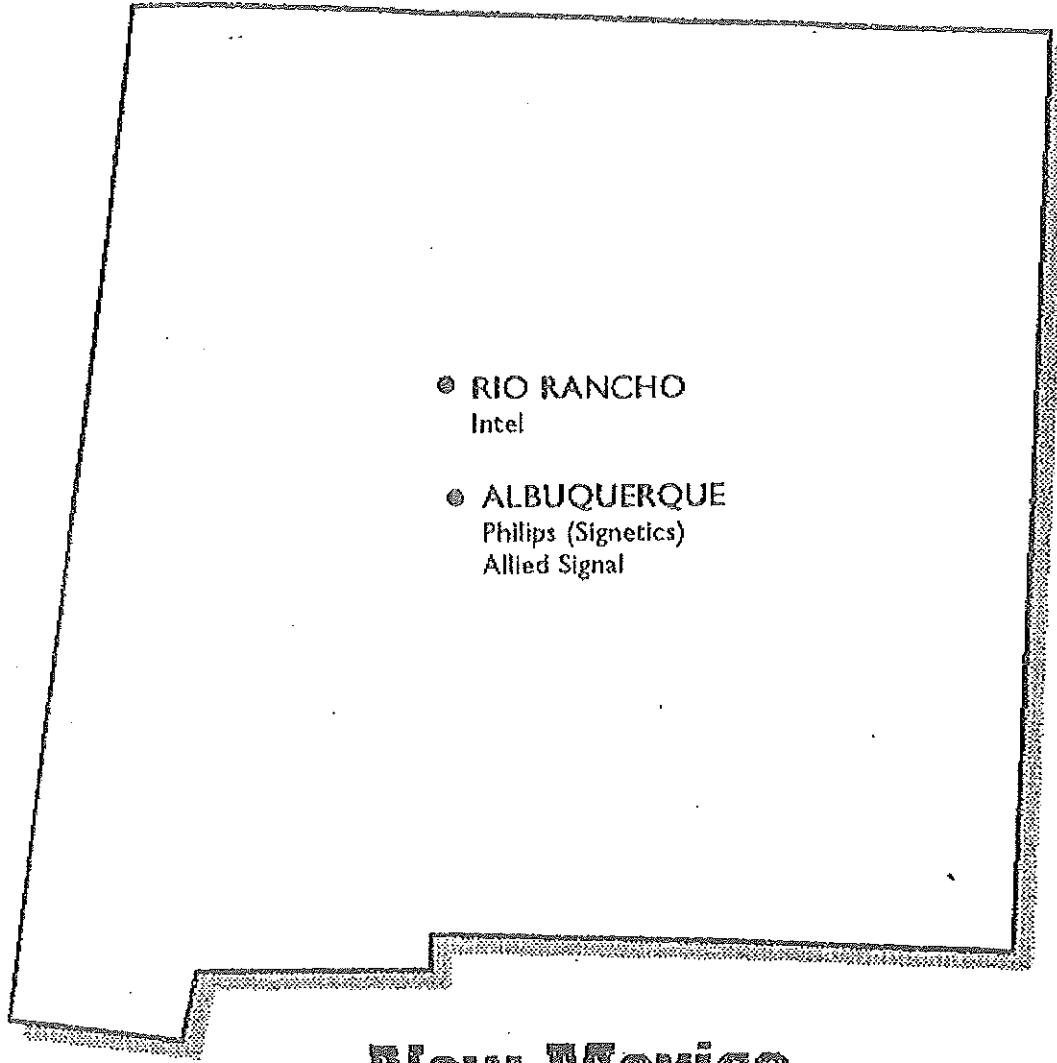
● PHOENIX  
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SGS-Thomson

● TEMPE  
Micro-Rel  
California Micro Devices  
Landsdale Semiconductor

● CHANDLER  
Motorola  
Microchip Technology  
Intel

● MESA  
Motorola

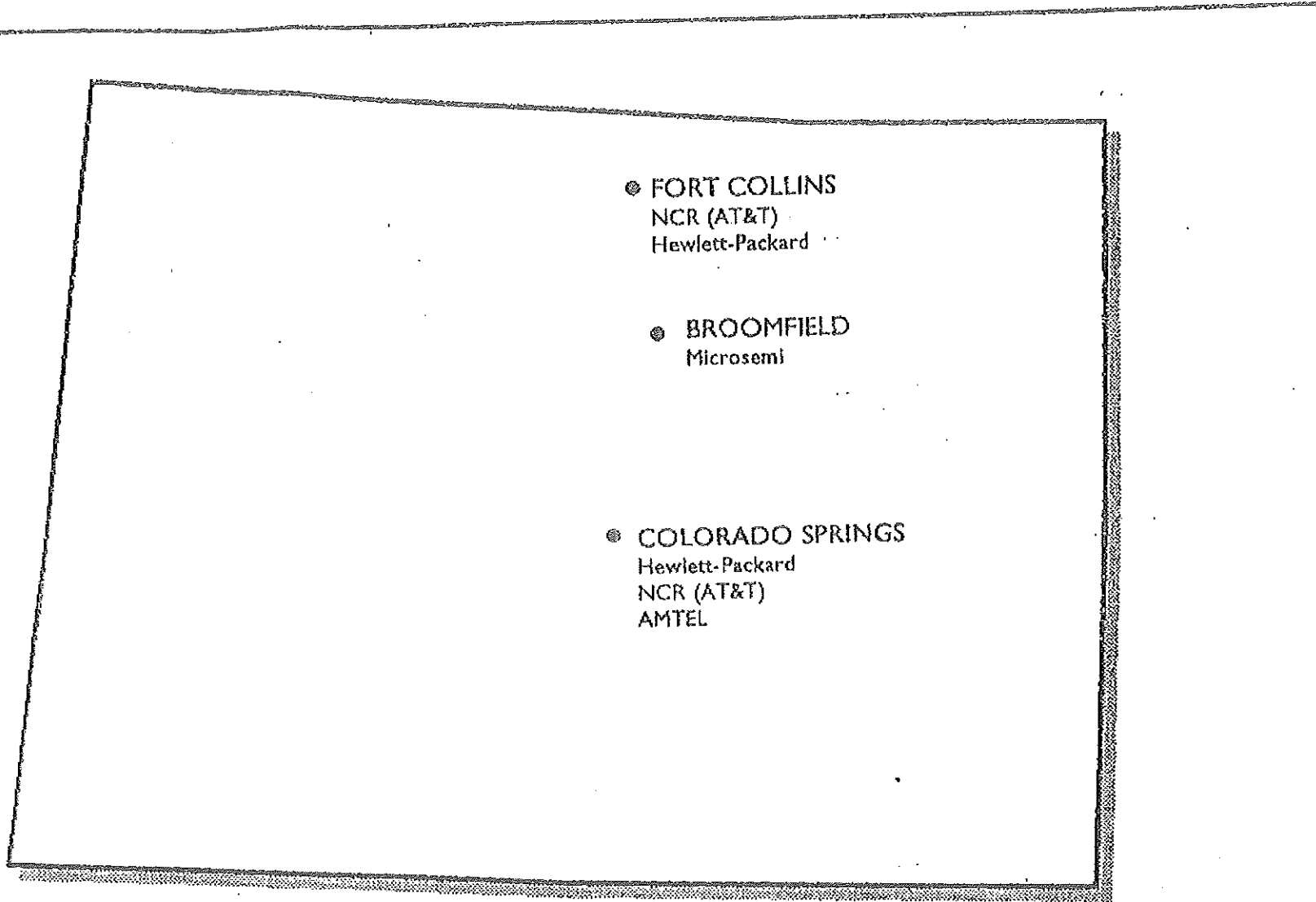
● SCOTTSDALE  
Microsemi



● RIO RANCHO  
Intel

● ALBUQUERQUE  
Philips (Signetics)  
Allied Signal

# New Mexico Semiconductor Fabs



# Colorado Semiconductor Fabs