

# RELAY REPORT



Timely, Accurate and Insightful Analysis of the Component Relay Market

North American  
ISSUE NO. 1  
VOLUME 3Q06  
August 2006

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## The Inaugural Issue

While Director of Marketing at Cherry Electrical Products, I searched for measures and methods to gauge our performance versus the marketplace. I was able to find market research that is published every two to three years, and the data is about twelve to eighteen months old when released.

Cumulus has changed this by initiating a market information service and publishing Switch Tracks, and now the Relay Report, shortly after the end of each calendar quarter. The Relay Report will provide timely, accurate, and insightful analysis of the component relay market. This will include trend data on sales and bookings in units and dollars, price trends for sales and bookings, and book to bill ratios in units and in dollars. Aside from market data, each issue will contain information on major industry topics, such as RoHS, and a summary of business and new product announcements made in the past quarter.

The Relay Report could not have been produced without the Founding Contributing Manufacturers, which are, American Zettler, CIT, Omron, Panasonic Electric Works, and Tyco. A sincere thank you to all that helped bring the Relay Report to life. It is the goal of Cumulus to exceed your expectations and provide information to help you manage and grow your business.

The Relay Report will grow. This issue of the Relay Reports covers electromechanical and solid state relays rated up to 30 amperes. By the end of this year our goal is to add additional contributing subscribers, particularly for the solid state relay type. Work on adding additional types of relays, such as, automotive, military/aerospace, radio frequency, and reed relays. Aside from new relay types, other geographic regions such as Europe, Asia, and the rest of world will be added, making the Relay Report the most comprehensive, timely, accurate, and insightful report on the global component relay market.

**Market Overview: Relay Market Starts 2006 With Sales Dollars Down X% And Booking X% Better Than The 1<sup>st</sup> Half of 2005**

Total reported sales for all relay types in North America for CY 2005 were \$XXXX M. The table below shows the breakdown of total sales and bookings by the two relays types currently being reported on in the Relay Report.

Category	CY 2005 Reported Sales			CY 2005 Reported Bookings		
	Dollars	Units	ASP	Dollars	Units	ABP
Electro-mechanical	\$XXXX M	XXXX M	\$XXXX	\$XXXX M	XXXX M	\$XXXX
Solid State	\$XXXX M	XXXXM	\$XXXX	\$XXXX M	XXXX M	\$XXXX
<b>Total</b>	\$XXXX M	XXXX M	\$XXXX	\$XXXX M	XXXX M	\$XXXX

The companies reporting sales were American Zettler, CIT, Omron, Panasonic Electric Works, and Tyco. The relay types they reported on are component electromechanical and solid state relays with a maximum rating of 30 amps. Appendix “A” defines which relay families are included by type, category, and contributing subscriber.

Based on the reported sales total of \$ XXXX M, the total North American market for the relay types covered in 2005 is estimated to be \$ XXXX M and XXXX M units.

The total booking dollars reported for all relay types in North America for CY 2005 equaled \$ XXXXM. Last year’s book-to-bill ratio for dollars was XXXX. Booking units equaled XXXX M and last year’s book-to-bill ratio for units was XXXX. Since unit bookings were slightly more than dollars the ratio of ABP-to-ASP came in just below X at XXXX.

The second quarter of this year was weaker in total sales dollars and units compared to Q1 of this year and Q2 of last year. Sales unit decreases were larger than dollars pushing ASP’s higher for electromechanical relays (EMR). The opposite happened for solid state relays (SSR). All EMR sales measures were down in the first half of 2006 compared to 2005 that drove totals lower. SSR’s grew significantly in sales dollars and units but also lost ground on ASP.

Sales Growth By Relay Type

Sales Relay Type	Q2 2006 Versus Q1 2006			Q2 2006 Versus Q2 2005			1 <sup>st</sup> Half of 2006 Versus 2005		
	Sales \$’s	Sales Units	ASP	Sales \$’s	Sales Units	ASP	Sales \$’s	Sales Units	ASP
Electro-mechanical	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%
Solid State	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%
<b>Total</b>	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%

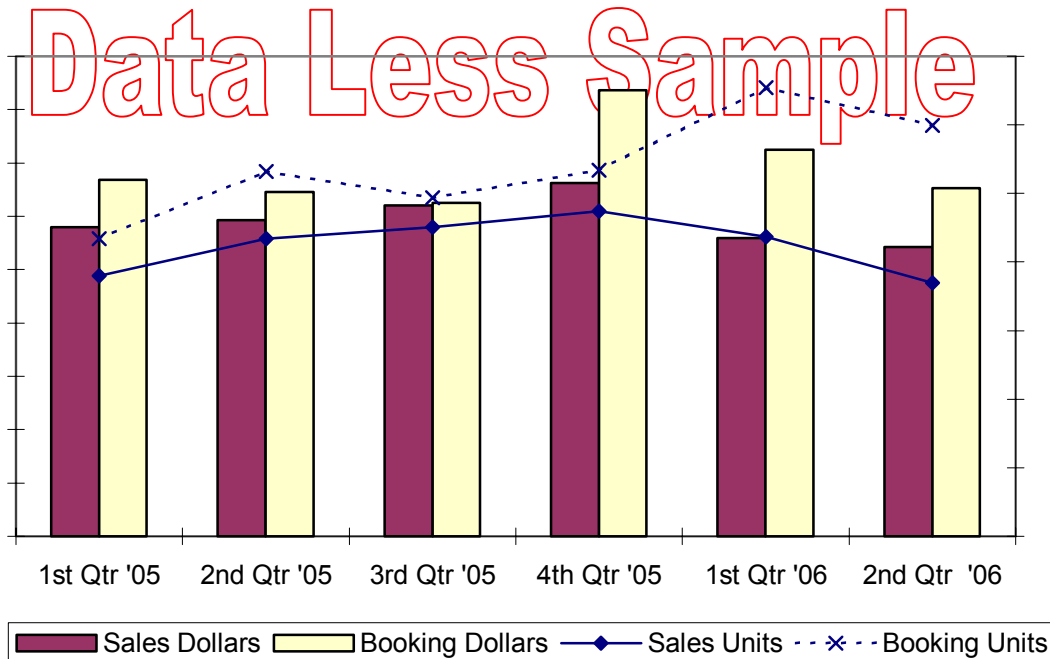
Reported booking dollars, units, and price decreased for EMR's when compared to the last quarter. SSR's experienced large booked unit growth and less significant dollar growth resulting in a noteworthy XX% decrease in ABP. Compared to the same quarter and first half of last year, booking dollars and units grew for both types of relays. The ABP for EMR's fell and SSR's rose.

Bookings Growth By Relay Type

Sales	Q2 2006 Versus Q1 2006			Q2 2006 Versus Q2 2005			1 <sup>st</sup> Half of 2006 Versus 2005			
	Relay Type	Booking \$'s	Booking Units	ABP	Booking \$'s	Booking Units	ABP	Booking \$'s	Booking Units	ABP
Electro-mechanical	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%
Solid State	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%
<b>Total</b>	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%	XX%

The graph below shows total quarterly sales and bookings in dollars and units for the reported data. All measures peaked in the fourth quarter of last year. Sales dollars and units, as well as, booking dollars have declined through the first two quarters of this year while booked units jumped in Q1 then receded a bit in Q2.

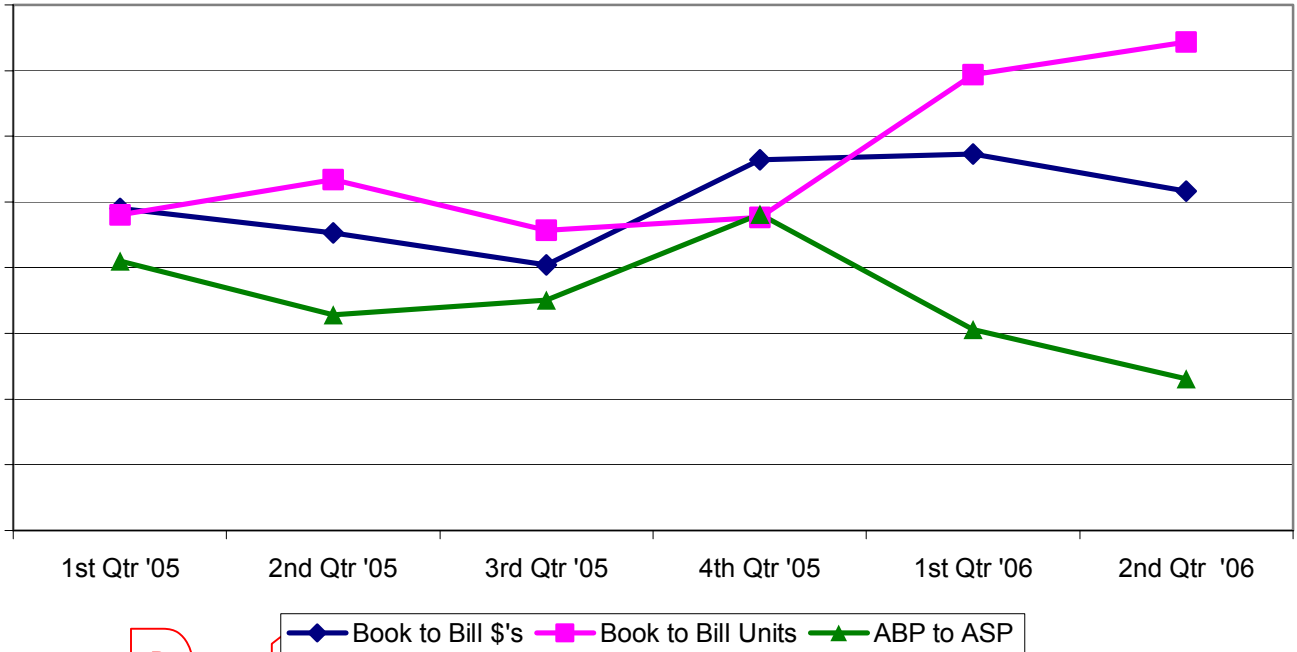
**CY 2005-2006 Total Reported Electromechanical & Solid State Relay Sales & Bookings**



This diverging trend in sales and booking units pushed the book-to-bill ratio for units to the XX level in Q1. The ratio of book-to-bill dollars has hovered between XX and XX since Q4. The ABP-to-ASP

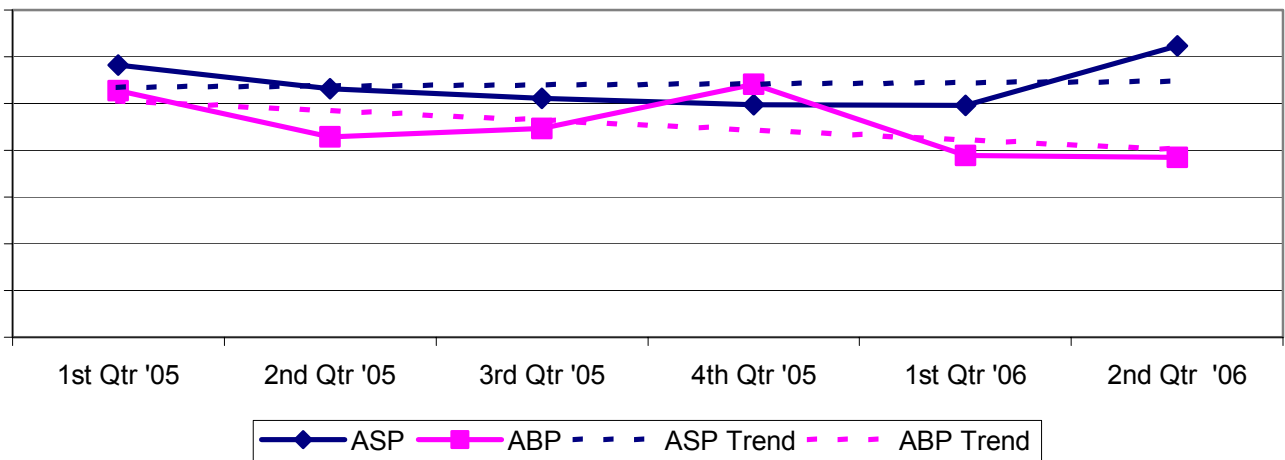
ratio dropped to XX or lower as the book-to-bill unit ratio jumped in Q1.

**CY 2005 - 2006 Ratios for Total Reported Electromechanical & Solid State Relay Market**



Overall selling prices recovered from their trend downward and Q1 low as the ASP set a six-quarter high in Q2. Aside from a move higher in Q4 of last year, the ABP drifts lower and Q2 2006 set a low for the charted period.

**CY 2005 - 2006 Prices for Total Reported Electromechanical & Solid State Relay Market**



Note the price graph above has trends included for the average selling and average booking prices. All of the price graphs will include either linear or polynomial regression analysis to show the trend of prices.

The two tables below show the breakdown of total reported sales and bookings by switch type.

Total Reported Q2 CY 2006 Sales by Type Versus Last and Same Qtr CY 2005

Category	Q2 CY 2006			Q1 CY 2006			Q2 CY 2005		
	Dollars	Units	ASP	Dollars	Units	ASP	Dollars	Units	ASP
Electro-mechanical	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M
Solid State	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M
<b>Total</b>	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M

Total Reported Q2 CY 2006 Bookings by Type Versus Last and Same Qtr CY 2005

Category	Q2 CY 2006			Q1CY 2006			Q2 CY 2006		
	Dollars	Units	ABP	Dollars	Units	ABP	Dollars	Units	ABP
Electro-mechanical	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M
Solid State	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M
<b>Total</b>	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M	\$XXX M

Sales and bookings are reported by type and category. The detail of this and the resulting book-to-bill and ABP-to-ASP ratios will be reported in the following sections.

### Electromechanical Relay Sales and Bookings for Q2 CY 2006

Total reported sales for CY 2005 for electromechanical relays (EMR) were \$ XXXX M and XXXX M units with an overall ASP of \$ XXXX per relay. The companies reporting sales were American Zettler, CIT, Omron, Panasonic Electric Works, and Tyco. Based on the sales of these manufacturers and estimates for those not yet reporting the total North American EMR market for CY 2005 is estimated at \$ XXXX M and XXXX M units. Total reported bookings for the same period were \$ XXXX M and XXXX M units with an overall ABP of \$ XXXX.

The two tables below show EMR sales and bookings for CY 2005 broken down by category.

CY 2005 Sales by Category

Category	Dollars	% Of Total Dollars	Units	% Of Total Units	ASP
Signal ≤ 3A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
PCB >3 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
PCB >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >3 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
<b>Total</b>	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX

CY 2005 Bookings by Category

Category	Dollars	% Of Total Dollars	Units	% Of Total Units	ABP
Signal ≤ 3A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
PCB >3 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
PCB >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >3 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
<b>Total</b>	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX

Total reported sales for Q2 CY 2006 for EMR's were \$ XXXX M and XXXX M units with an overall ASP of \$XXXX per relay. The companies reporting sales were American Zettler, CIT, Omron, Panasonic Electric Works, and Tyco. Based on the sales of these manufacturers and estimates for those not yet reporting the total North American EMR market for Q2 CY 2006 is estimated at \$ XXXX M and XXXX M units. Total reported bookings for the same period were \$ XXXX M and XXXX M units with an overall ABP of \$XXXX.

The two tables below show the breakdown of total reported sales and bookings for Q2 CY 2006 by category:

Q2 2006 Sales by Category

Category	Dollars	% Of Total Dollars	Units	% Of Total Units	ASP
Signal ≤ 3A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
PCB >3 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
PCB >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >3 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
<b>Total</b>	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX

Q2 2006 Bookings by Category

Category	Dollars	% Of Total Dollars	Units	% Of Total Units	ABP
Signal ≤ 3A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
PCB >3 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
PCB >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >3 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
<b>Total</b>	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX

Sales for Q2 CY 2006 compared to Q1 CY 2006 show overall decreases in both dollars and units for all but high amperage panel/plug-in's. The overall ASP was up almost XX% driven by a XX% decrease in signal relay units that led to a XX% increase in ASP. The same dynamic drove high amperage PCB relay ASP's XX% higher. The other three categories saw lower ASP's.

Sales for Q2 CY 2006 Versus Q1CY 2006

Category	Q2 CY 2006			Q1 CY 2006			% Change		
	Dollars	Units	ASP	Dollars	Units	ASP	Dollars	Units	ASP
Signal ≤ 3A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%

Contrasting Q2 CY 2006 versus Q1 CY 2006 reveals significant booking dollar and unit losses for signal and high amp PCB relays. In both, the unit losses out paced dollars elevating the ABP's for these groups. The large increase in high amp panel/plug-in group helped to soften the quarter over quarter total dollar and unit losses, but, the major ABP drop of this group equalized the gains mentioned previously.

#### Bookings for Q2 CY 2006 Versus Q1 CY 2005

Category	Q2 CY 2006			Q1 CY 2006			% Change		
	Dollars	Units	ABP	Dollars	Units	ABP	Dollars	Units	ABP
Signal ≤ 3A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%

Compared to Q2 CY 2005, total EMR sales dollars, units and ASP for Q2 CY 2006 were down XX%, down XX% and up XX% respectively. Unit declines in the three largest categories, signal & PCB relays, forced the total units south. PCB's lower sales dollars commanded the total. Stronger ASP's for signal and high amp PCB elevated the group.

#### Sales for Q2 CY 2006 Versus Q2 CY 2005

Category	Q2 CY 2006			Q2 CY 2005			% Change		
	Dollars	Units	ASP	Dollars	Units	ASP	Dollars	Units	ASP
Signal ≤ 3A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%



When total EMR bookings from Q2 CY 2006 were compared to Q2 CY 2005 both total dollars were almost unchanged and units were up XX% pushing the ABP down XX%. The XX% loss in low amp PCB booking dollars was offset by gains in the other categories. A similar situation occurred in units with an XX% drop in high amp PCB relays easily covered by increased units in the other groups, this group was also the only one to have an increase in ABP.

#### Bookings for Q2 CY 2006 Versus Q2 CY 2005

Category	Q2 CY 2006			Q2 CY 2005			% Change		
	Dollars	Units	ABP	Dollars	Units	ABP	Dollars	Units	ABP
Signal ≤ 3A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%

Sales dollars and units for the first half of 2006 progressed over last year for signal and both groups of panel/plug-in relays. The losses in PCB relay categories overshadowed these gains and the EMR totals were down XX% in dollars and about equal to last year in units. Heavy selling price descent in low amp PCB relays pulled the total group south.

#### Sales for 1<sup>st</sup> Half of CY 2006 Versus CY 2005

Category	1 <sup>st</sup> Half of CY 2006			1 <sup>st</sup> Half of Q2 CY 2005			% Change		
	Dollars	Units	ASP	Dollars	Units	ASP	Dollars	Units	ASP
Signal ≤ 3A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%

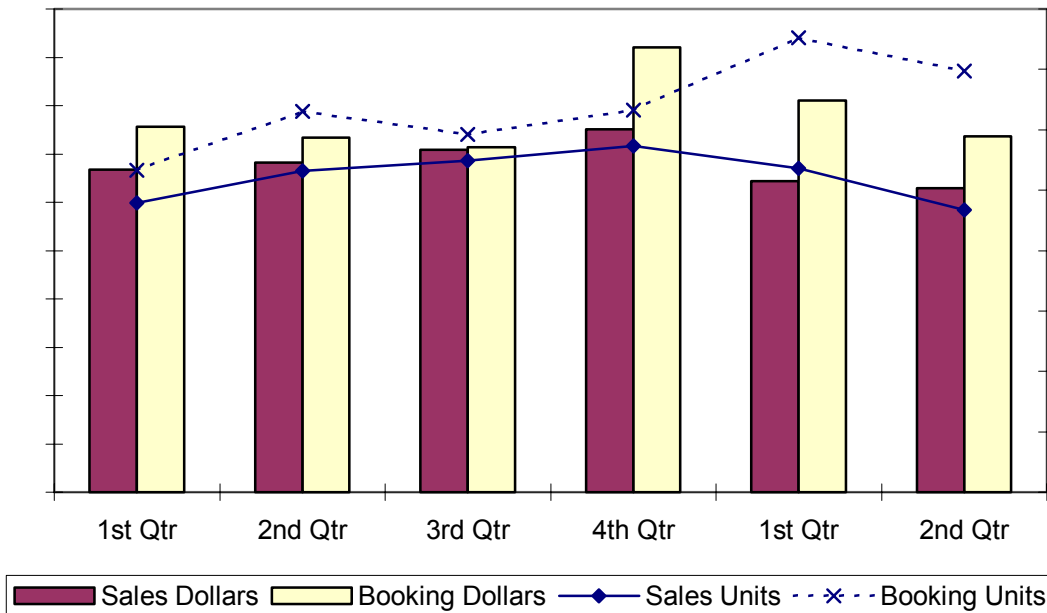
All categories, except low amp PCB, increased in booking dollars over the first half of last year. Stronger improvement was registered for units. ABP's faired the worst, where like sales, low amp PCB relays led the total group lower.

Bookings for 1<sup>st</sup> Half of CY 2006 Versus CY 2005

Category	1 <sup>st</sup> Half of CY 2006			1 <sup>st</sup> Half of CY 2005			% Change		
	Dollars	Units	ABP	Dollars	Units	ABP	Dollars	Units	ABP
Signal ≤ 3A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
PCB >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >3 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$XXXXM	XXXXM	\$ XXXX	XXX %	XXX%	XXX%

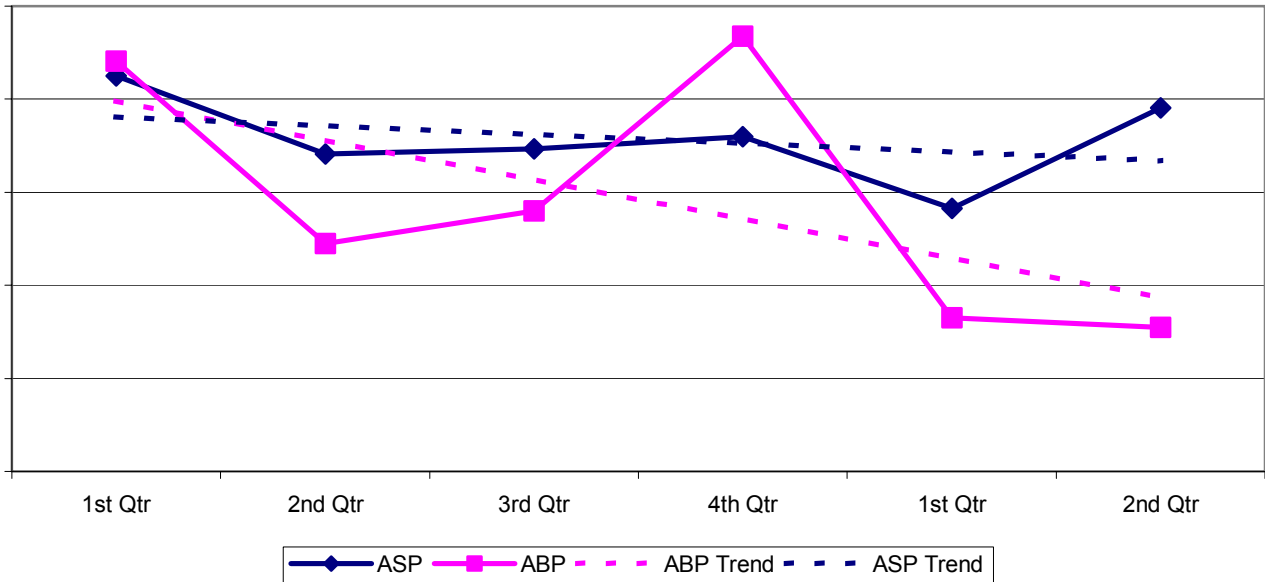
The chart below shows the sales and bookings in units and dollars for the reported total EMR market for the past six quarters. Since EMR's make up a dominant majority of current reported sales, this graph is almost identical to the graph above (page 3) for the total reported sales and bookings.

**CY 2005/2006 Total Electromechanical Relay Sales & Bookings**



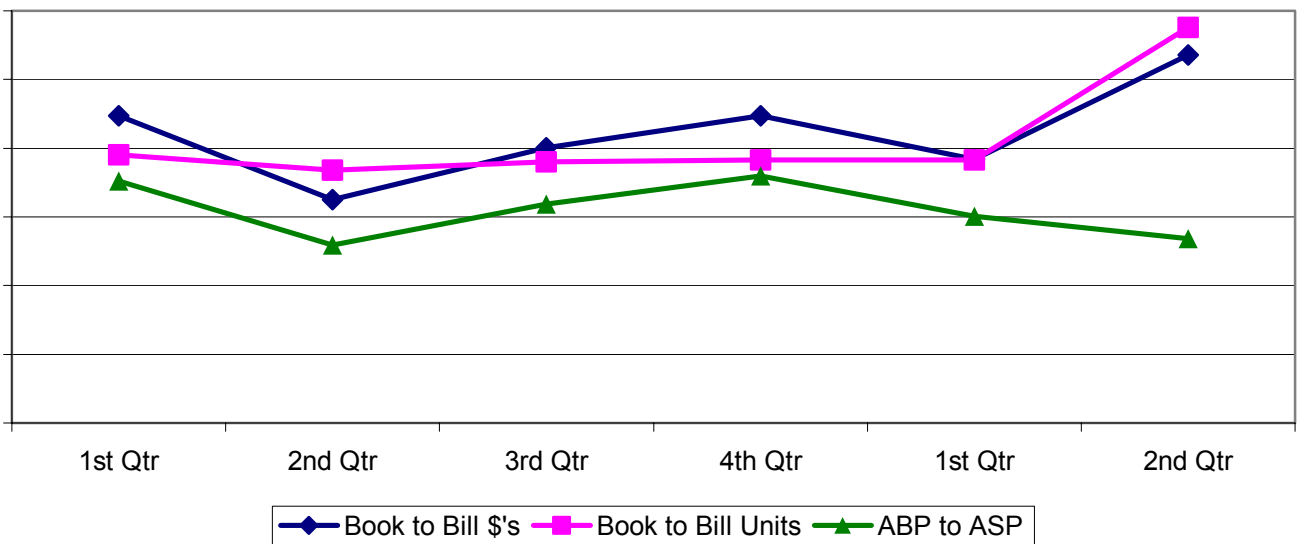
Last quarter the ASP for total EMR's ended a near steady descent from Q1 of 2005. The ABP has descended quicker, except for a spike in Q4 of last year.

**CY 2005/2006 Prices for Total Electromechanical Relay Market**



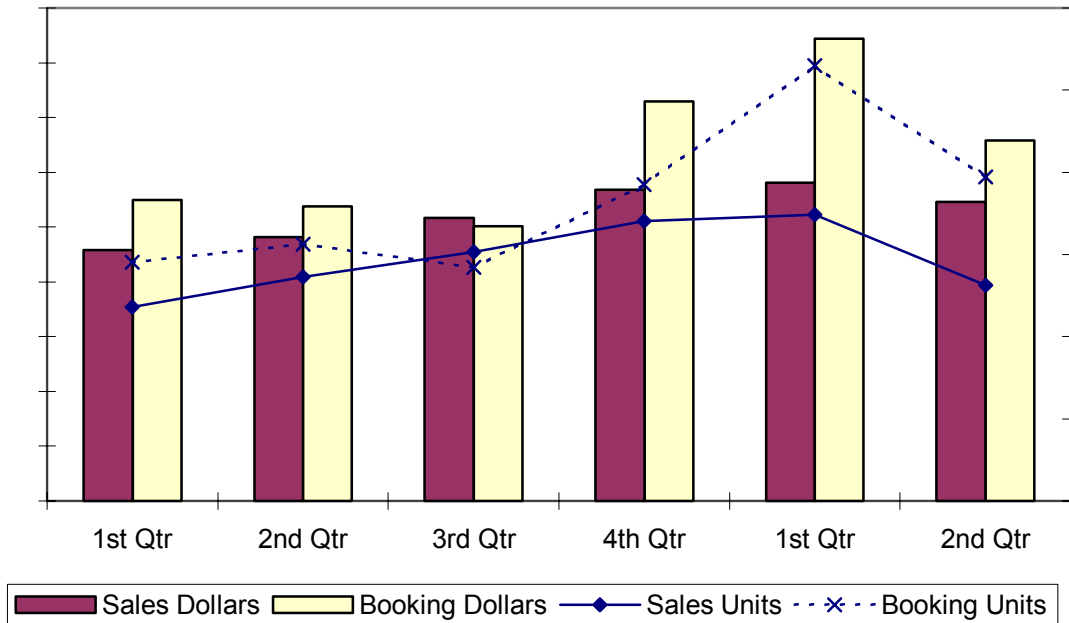
Book-to-bill dollars and units both peaked at six quarter highs this past quarter while the ABP-to-ASP ratio dropped to be near its lowest level for this reporting period.

**CY 2005/2006 Ratios for Total Electromechanical Relay Market**



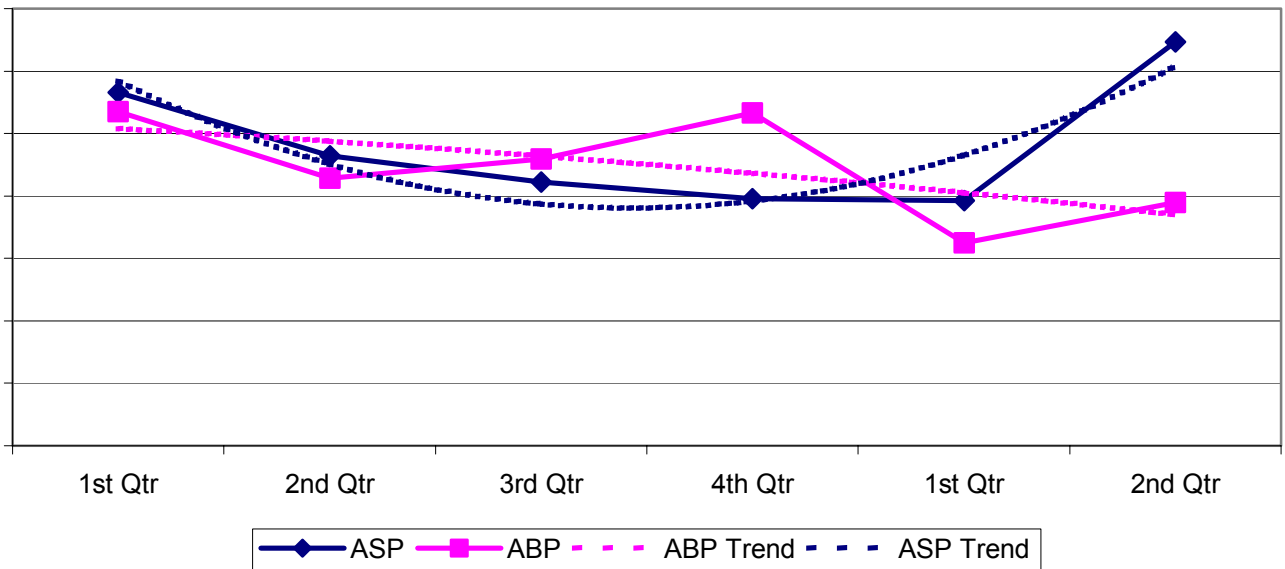
The following graphs show quarterly performance of each category of EMR. Sales and booking dollars and units grew from Q1 2005 to a peak in Q1 of 2006 then fell off. Both ABP and ASP rebounded from six quarter lows in Q1 of this year.

**CY 2005/2006 Total Signal, ≤ 3A, EM Relay Sales & Bookings**



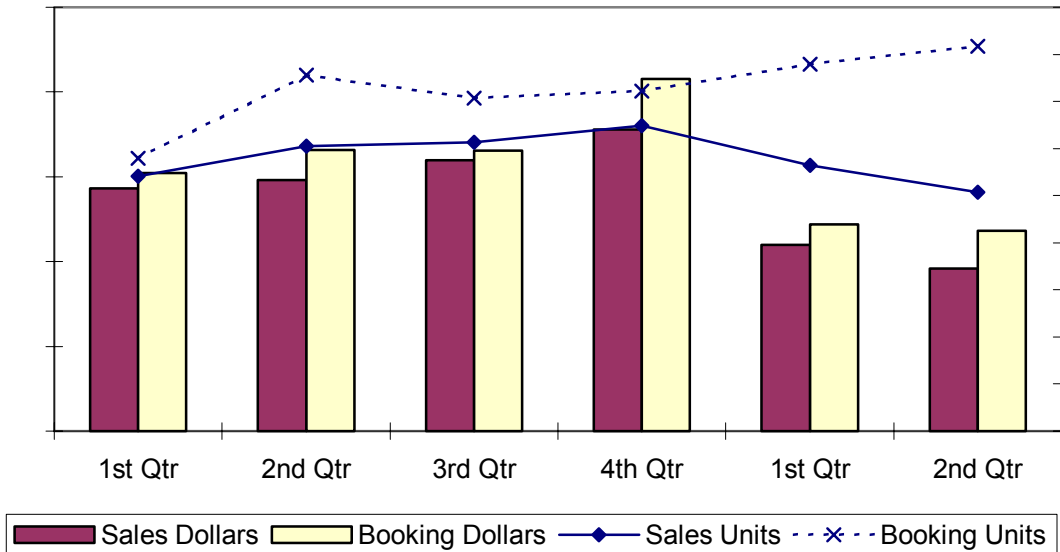
Data Less Sample

**CY2005/2006 Signal, ≤ 3A, EM Relay Prices**

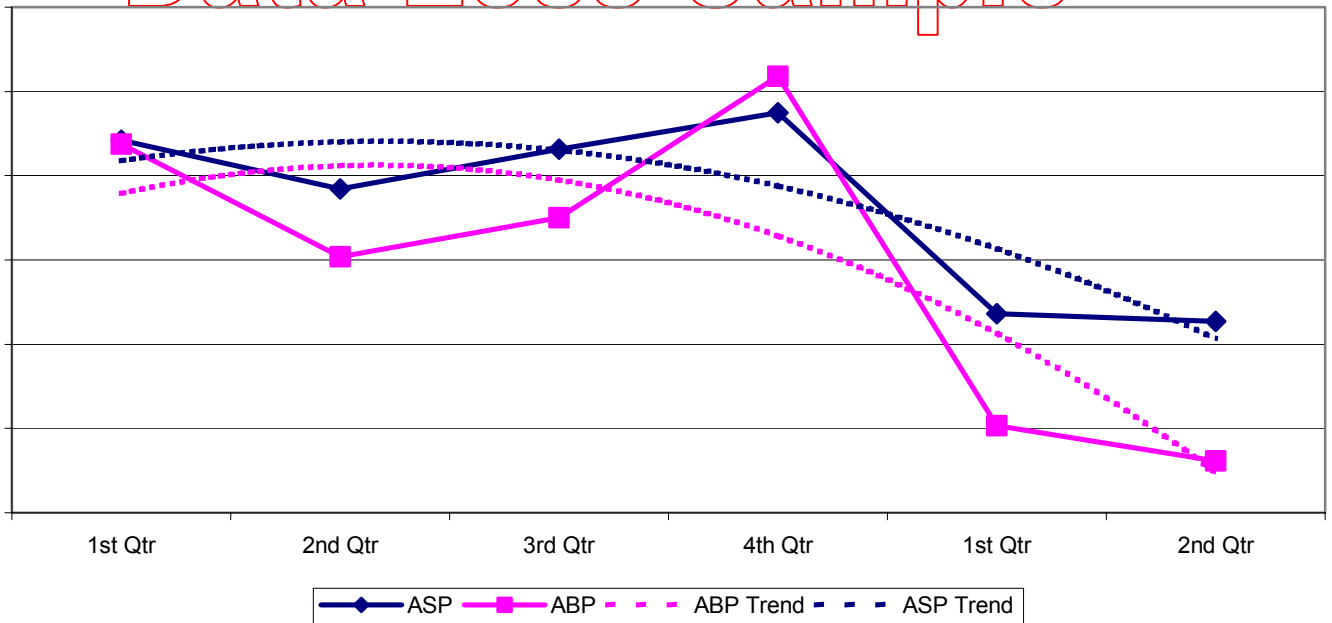


Low amp PCB relays units and dollars for sales and bookings progressed well through 2005. In 2006, sales dollars and units, as well as, booking dollars were knocked down sharply. The ASP and ABP for this category experienced the same dramatic fall after the first of this year.

**CY 2005/2006 Total PCB Mount,  $\geq 3 - 20A$ , EM Relay Sales & Bookings**

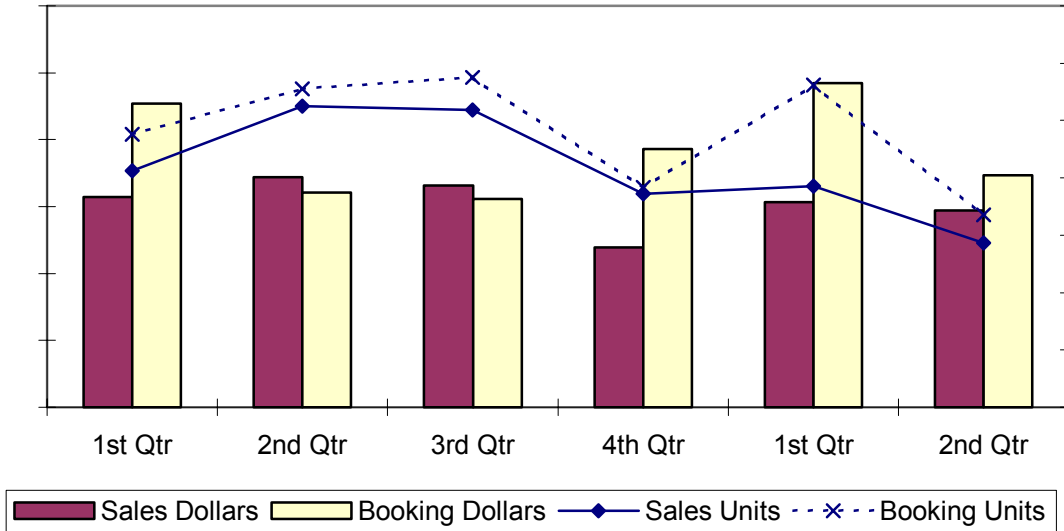


**CY 2005/2006 PCB Mount,  $>3 - 20A$ , EM Relay Prices**  
Data Less Sample

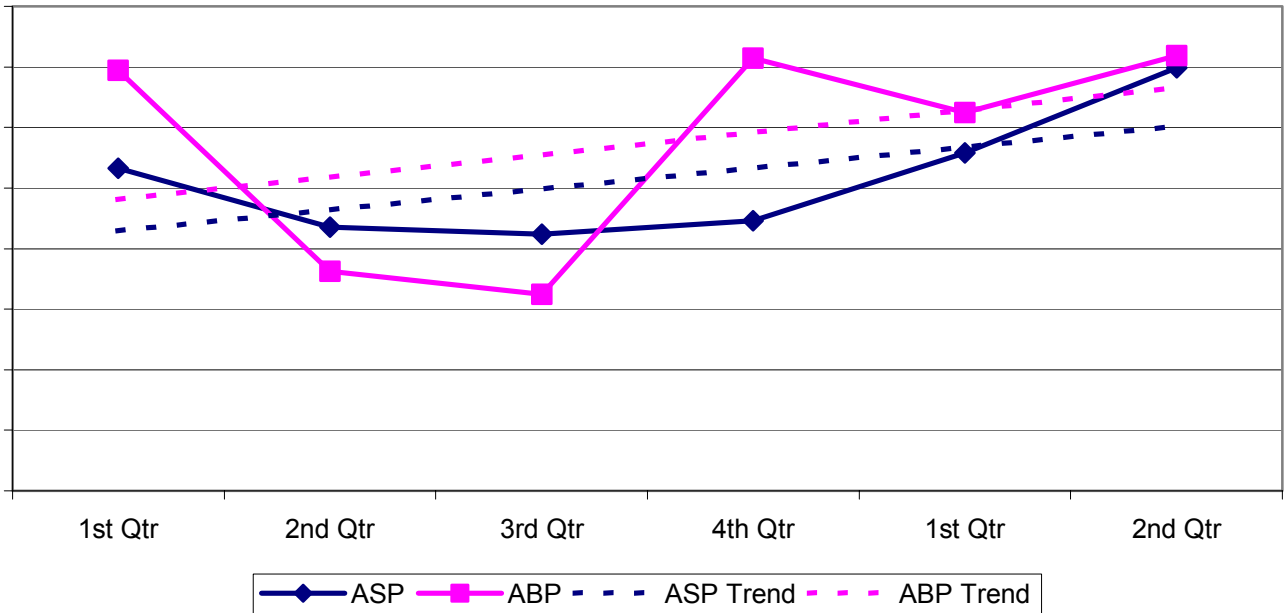


Sales and booking units and dollars for high amp PCB relays have fluctuated up and down during the last six quarters, with bookings having greater change. The ABP and ASP experienced their lows in the middle half of last year and have risen over the last three last three quarters.

**CY 2005/2006 Total PCB Mount, >20 - 30A, EM Relay Sales & Bookings**

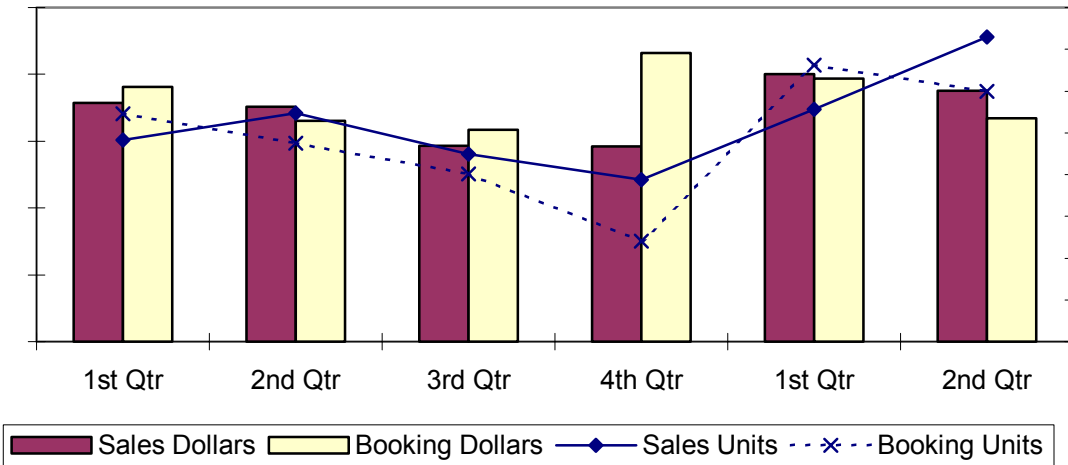


**Data Loss Sample**  
**CY 2005/2006 PCB Mount, >20 - 30A, EM Relay Prices**

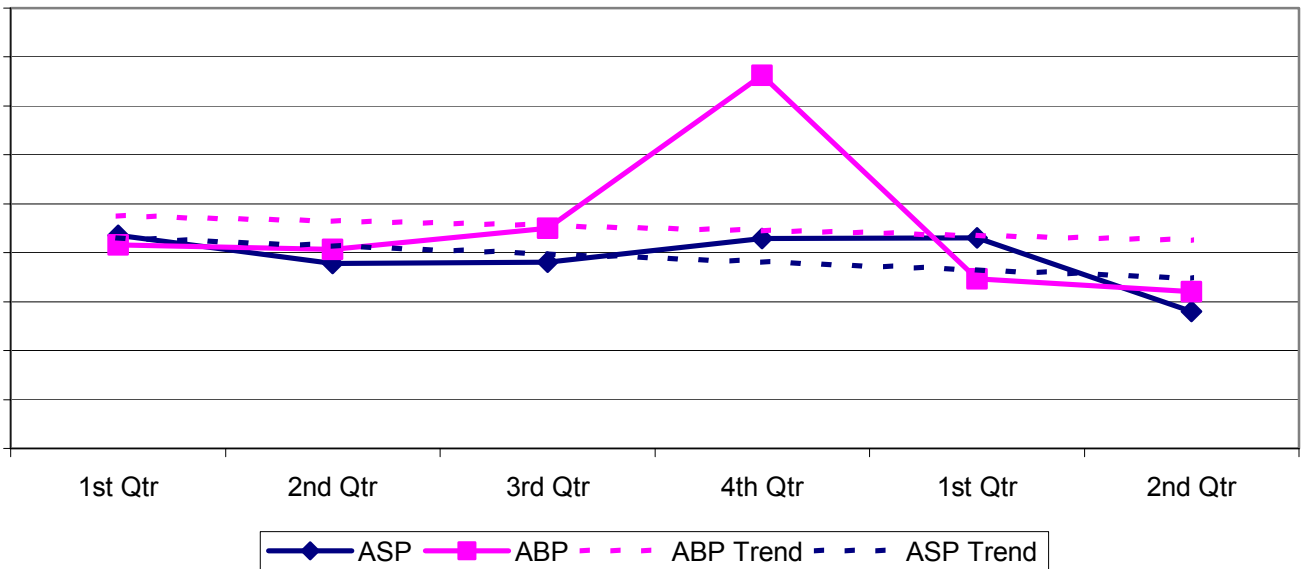


A slow slide down best describes low amp panel/plug-in sales and booking measures for the first three quarters of CY 2005. The fourth quarter realized a major step up for booked dollars that pulled sales up in the first half of this year. Despite a spike in Q4, the ASP and ABP for this group slips lower over time.

**CY 2005/2006 Total Panel/Plug-In Mount, >3-20A, EM Relay Sales & Bookings**

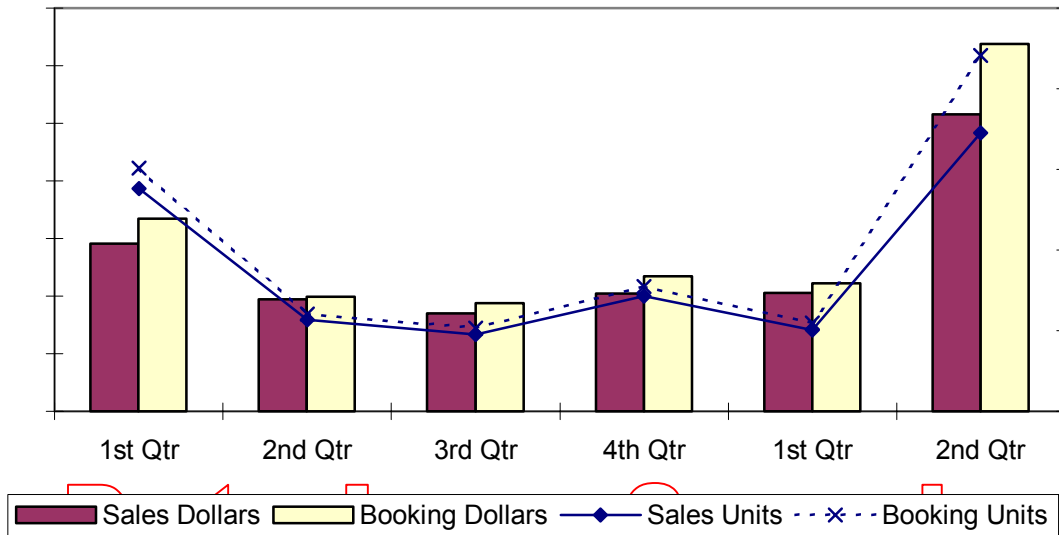


**Data Less Sample**  
 CY 2005/2006 Panel/Plug-In Mount, >3 - 20A, EM Relay Prices



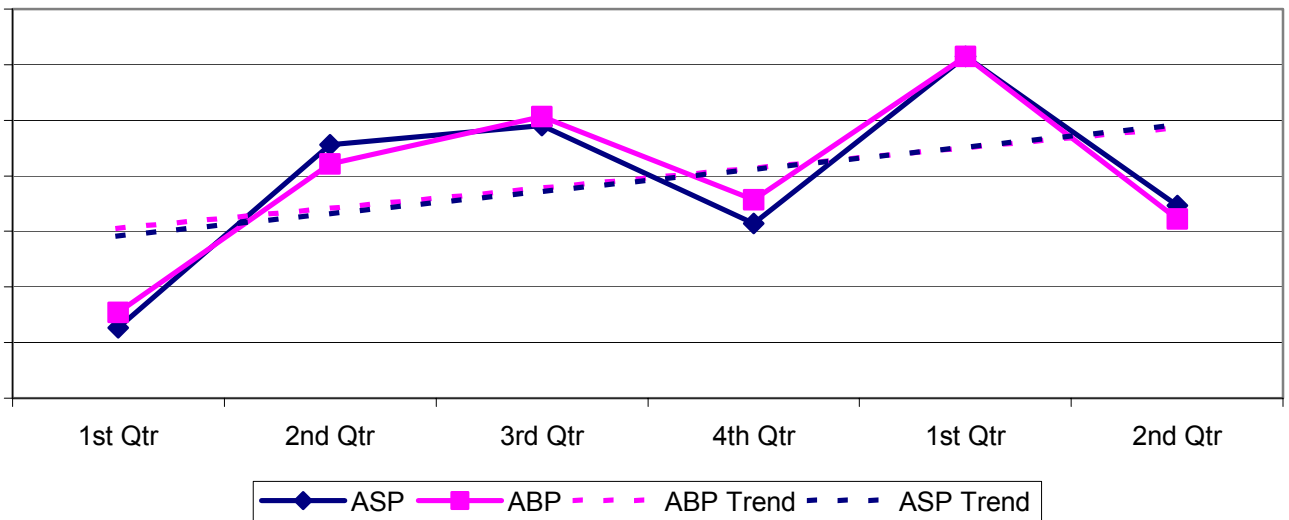
The large spike up for sales and bookings of high amp panel/plug-in relays leaps out of the graph below. Aside from this, measures had receded from previous highs set in the first quarter of 2005. Dips in Q2 of this year and Q4 are the only variation in a consistent march up for the ASP and ABP of this group

**CY 2005/2006 Total Panel/Plug-In Mount, >20 - 30A, EM Relay Sales & Bookings**



Data Less Sample

**CY 2005/2006 Panel/Plug-In Mount, >20 - 30A, EM Relay Prices**





**Q2 CY 2006 Total Reported Electromechanical Relay Data**

<u>Sales</u>	<u>2<sup>nd</sup> Qtr</u>	<u>Bookings</u>	<u>2<sup>nd</sup> Qtr</u>	<u>Ratios</u>	<u>2<sup>nd</sup> Qtr</u>
<b>Signal ≤ 3A</b>		<b>Signal ≤ 3A</b>		<b>Signal ≤ 3A</b>	
Sales Dollars	\$XXXXX	Booking Dollars	\$XXXXX	Book to Bill \$'s	XXXX
Sales Units	XXXXX	Booking Units	XXXXX	Book to Bill Units	XXXX
ASP	\$XXXX	ABP	\$XXXX	ABP to ASP	XXXX
<b>PCB &gt;3 – 20A</b>		<b>PCB &gt;3 – 20A</b>		<b>PCB &gt;3 – 20A</b>	
Sales Dollars	\$XXXXX	Booking Dollars	\$XXXXX	Book to Bill \$'s	XXXX
Sales Units	XXXXX	Booking Units	XXXXX	Book to Bill Units	XXXX
ASP	\$XXXX	ABP	\$XXXX	ABP to ASP	XXXX
<b>PCB &gt;20 – 30A</b>		<b>PCB &gt;20 – 30A</b>		<b>PCB &gt;20 – 30A</b>	
Sales Dollars	\$XXXXX	Booking Dollars	\$XXXXX	Book to Bill \$'s	XXXX
Sales Units	XXXXX	Booking Units	XXXXX	Book to Bill Units	XXXX
ASP	\$XXXX	ABP	\$XXXX	ABP to ASP	XXXX
<b>Panel/Plug-in &gt;3 – 20A</b>		<b>Panel/Plug-in &gt;3 – 20A</b>		<b>Panel/Plug-in &gt;3 – 20A</b>	
Sales Dollars	\$XXXXX	Booking Dollars	\$XXXXX	Book to Bill \$'s	XXXX
Sales Units	XXXXX	Booking Units	XXXXX	Book to Bill Units	XXXX
ASP	\$XXXX	ABP	\$XXXX	ABP to ASP	XXXX
<b>Panel/Plug-in &gt;20 – 30A</b>		<b>Panel/Plug-in &gt;20 – 30A</b>		<b>Panel/Plug-in &gt;20 – 30A</b>	
Sales Dollars	\$XXXXX	Booking Dollars	\$XXXXX	Book to Bill \$'s	XXXX
Sales Units	XXXXX	Booking Units	XXXXX	Book to Bill Units	XXXX
ASP	\$XXXX	ABP	\$XXXX	ABP to ASP	XXXX
<b>Totals</b>		<b>Totals</b>		<b>Total</b>	
Sales Dollars	\$XXXXX	Booking Dollars	\$XXXXX	Book to Bill \$'s	XXXX
Sales Units	XXXXX	Booking Units	XXXXX	Book to Bill Units	XXXX
ASP	\$XXXX	ABP	\$XXXX	ABP to ASP	XXXX

Data Less Sample

## Solid State Relay Sales and Bookings for Q2 CY 2006

Total reported sales for CY 2005 for solid state relays (SSR) were \$ XXXX M and XXXX M units with an overall ASP of \$ XXXX per relay. The companies reporting sales were American Zettler, Omron, Panasonic Electric Works, and Tyco. Based on the sales of these manufacturers and estimates for those not yet reporting the total North American market for SSR's rated 30 amps or less for CY 2005 is estimated at \$ XXXX M and XXXX M units. Total reported bookings for the same period were \$ XXXX M and XXXX M units with an overall ABP of \$ XXXX.

The two tables below show SSR sales and bookings for CY 2005 broken down by category.

### CY 2005 Sales by Category

Category	Dollars	% Of Total Dollars	Units	% Of Total Units	ASP
PCB >2 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >2 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
<b>Total</b>	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX

### CY 2005 Bookings by Category

Category	Dollars	% Of Total Dollars	Units	% Of Total Units	ABP
PCB >2 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >2 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
<b>Total</b>	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX

Total reported sales for Q2 CY 2006 for SSR's were \$ XXXX M and XXXX M units with an overall ASP of \$XXXX per relay. The companies reporting sales were American Zettler, Omron, Panasonic Electric Works, and Tyco. Based on the sales of these manufacturers and estimates for those not yet reporting the total North American market for SSR's rated 30 amps or less for Q2 CY 2006 is estimated at \$ XXXX M and XXXX M units. Total reported bookings for the same period were \$ XXXX M and XXXX M units with an overall ABP of \$XXXX.

The two tables below show the breakdown of total reported sales and bookings for Q2 CY 2006 by category.

Q2 Sales by Category

Category	Dollars	% Of Total Dollars	Units	% Of Total Units	ASP
PCB >2 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >2 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
<b>Total</b>	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX

Q2 Bookings by Category

Category	Dollars	% Of Total Dollars	Units	% Of Total Units	ABP
PCB >2 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >2 – 20A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
Panel/Plug-in >20 – 30A	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX
<b>Total</b>	\$ XXXX M	XXX %	XXXX M	XXX %	\$ XXXX

The sales dollar and unit loss in the high amp panel/plug-in group pushed total dollars and ASP lower for Q2 CY 2006 compared to Q1 CY 2006. Unit growth and near steady dollars in the other two groups also led to slackening ASP's.

Sales for Q2 CY 2006 Versus Q1 CY 2006

Data Less Sample

Category	Q2 CY 2006			Q1 CY 2006			% Change		
	Dollars	Units	ASP	Dollars	Units	ASP	Dollars	Units	ASP
PCB >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %

Bookings dollars and units surged for PCB SSR's washing out the drop in high amperage panel/plug-ins to post an overall gain in Q2 CY 2006 versus Q1. All groups saw a lower ABP. The total ABP loss was worse than any single category as the product mix shifted from high to lower priced SSR's

Bookings for Q2 CY 2006 Versus Q1 CY 2006

Category	Q2 CY 2006			Q1 CY 2006			% Change		
	Dollars	Units	ABP	Dollars	Units	ABP	Dollars	Units	ABP
PCB >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %

Compared to Q2 CY 2005, total SSR sales dollars and units increased significantly, XX% and XX% respectively, with the total ASP falling XX% due to a XX% decline in PCB relays.

Sales for Q2 CY 2006 Versus Q2 CY 2005

Category	Q2 CY 2006			Q2 CY 2005			% Change		
	Dollars	Units	ASP	Dollars	Units	ASP	Dollars	Units	ASP
PCB >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %

Q2 CY 2006 total SSR booking dollars and units compared to Q2 CY 2005 grew by XX% and XX%, respectively. All categories contributed to this growth, except for a unit decline in low amperage panel/plug-in relays. ABP improved in total as the to low amperage categories moved up some XX%.

Bookings for Q2 CY 2006 Versus Q2 CY 2005

Category	Q2 CY 2006			Q2 CY 2005			% Change		
	Dollars	Units	ABP	Dollars	Units	ABP	Dollars	Units	ABP
PCB >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %

PCB and high amperage panel/plug-in improved XX% in sales dollars during the first half of CY 2006 compared to the period a year ago. A near XX% growth in PCB relay units sent its and the whole groups ASP down.

Sales for 1<sup>st</sup> Half of CY 2006 Versus CY 2005

Category	1 <sup>st</sup> Half of CY 2006			1 <sup>st</sup> Half of CY 2005			% Change		
	Dollars	Units	ASP	Dollars	Units	ASP	Dollars	Units	ASP
PCB >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %

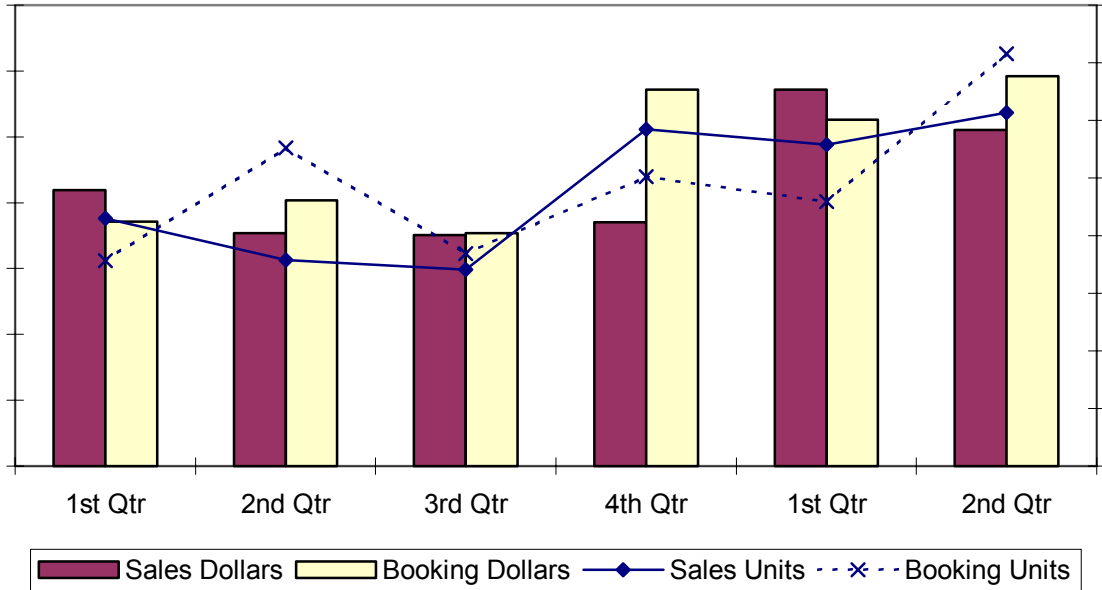
First half bookings came in similar to sales. Here dollar performance generally out did units resulting better ABP's.

Bookings for 1<sup>st</sup> Half of Q2 CY 2006 Versus CY 2005

Category	1 <sup>st</sup> Half of CY 2006			1 <sup>st</sup> Half of CY 2005			% Change		
	Dollars	Units	ABP	Dollars	Units	ABP	Dollars	Units	ABP
PCB >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >2 – 20A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
Panel/Plug-in >20 – 30A	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %
<b>Total</b>	\$XXXXM	XXXXM	\$ XXXX	\$ XXXX M	XXXXM	\$XXXX	XXX %	XXX %	XXX %

The chart below shows the sales and bookings in units and dollars for the reported total SSR market for the past six quarters. All measurements climbed to their highest levels in first half of this year.

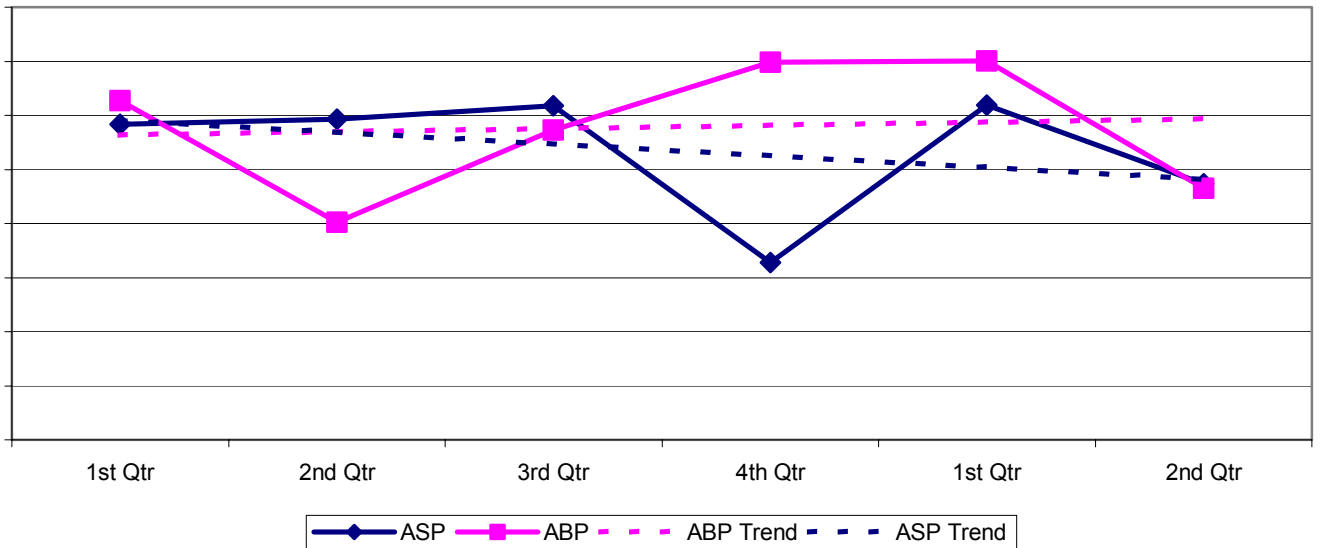
**CY 2005/2006 Total Solid State Relay Sales & Bookings**



Below is the six quarter trend for ABP and ASP for the total SSR market. Both the ABP and ASP slid off last quarter's highs.

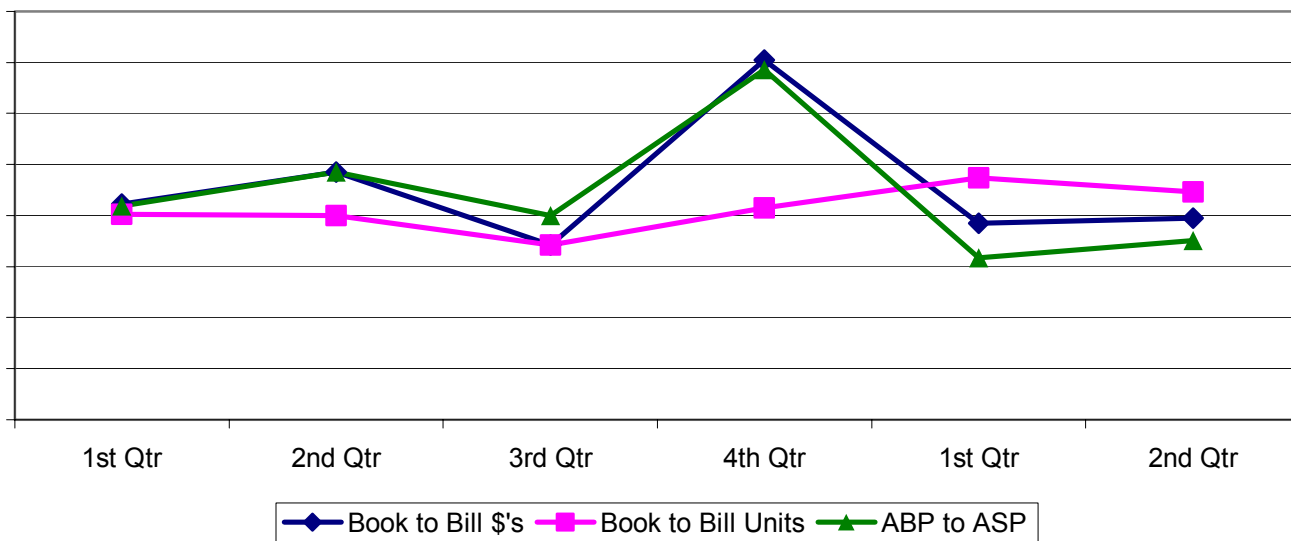
Data Less Sample

**CY 2005/2006 Prices for Total Solid State Relay Market**



SSR book-to-bill dollars remained flat, just below XX after failing from a Q4 peak. The ABP to ASP also peaked in Q4 dropped in Q1 and recovered some last quarter. Book-to-bill units shows the least volatility as it meanders above and below XX.

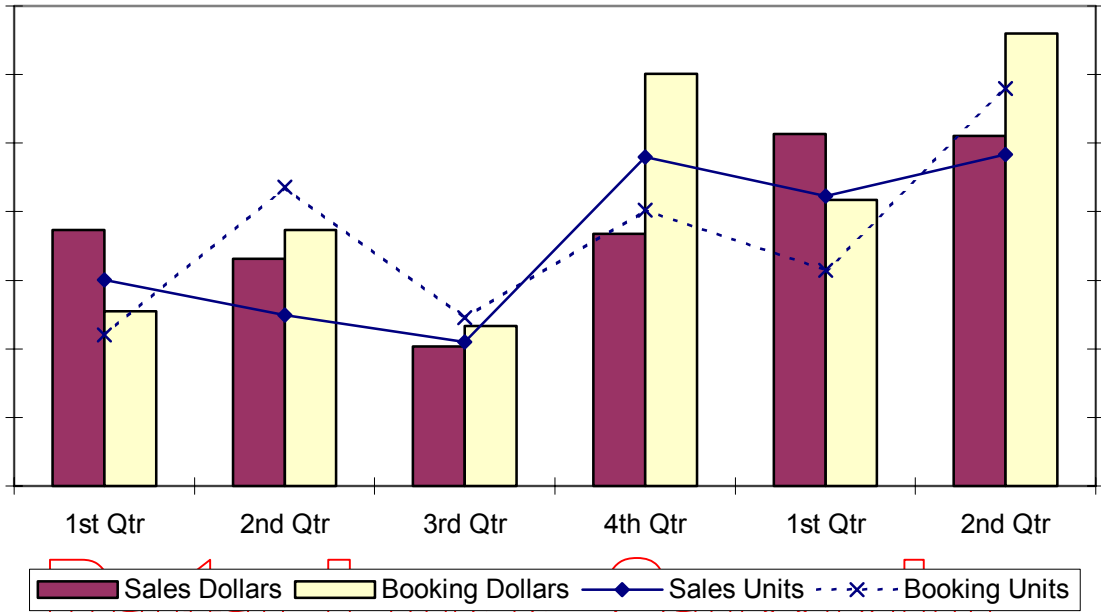
CY 2005/2006 Ratios for Total Solid State Relay Market



Data Less Sample

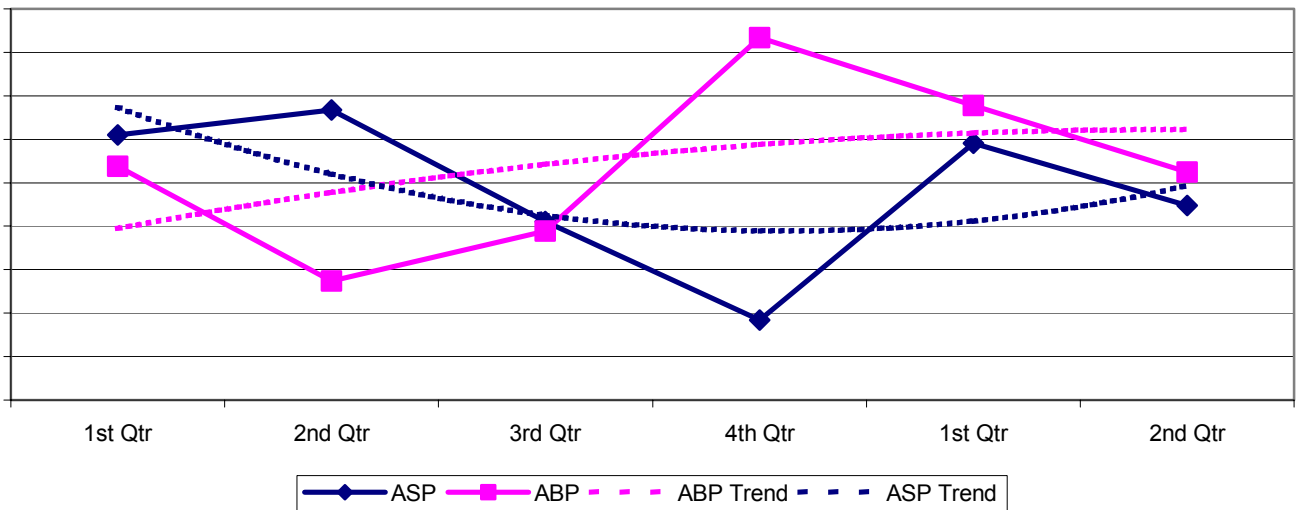
Quarterly results for each of the three product categories show the sources of the overall market trends. PCB relay sales and booking metrics have risen from Q3 CY 2005 trough. Significant quarter over quarter variation in the ABP and ASP shows trends of a recovery ASP and rising ABP.

**CY 2005/2006 Total PCB Mount,  $\geq 2$  - 20A, SS Relay Sales & Bookings**



Data Less Sample

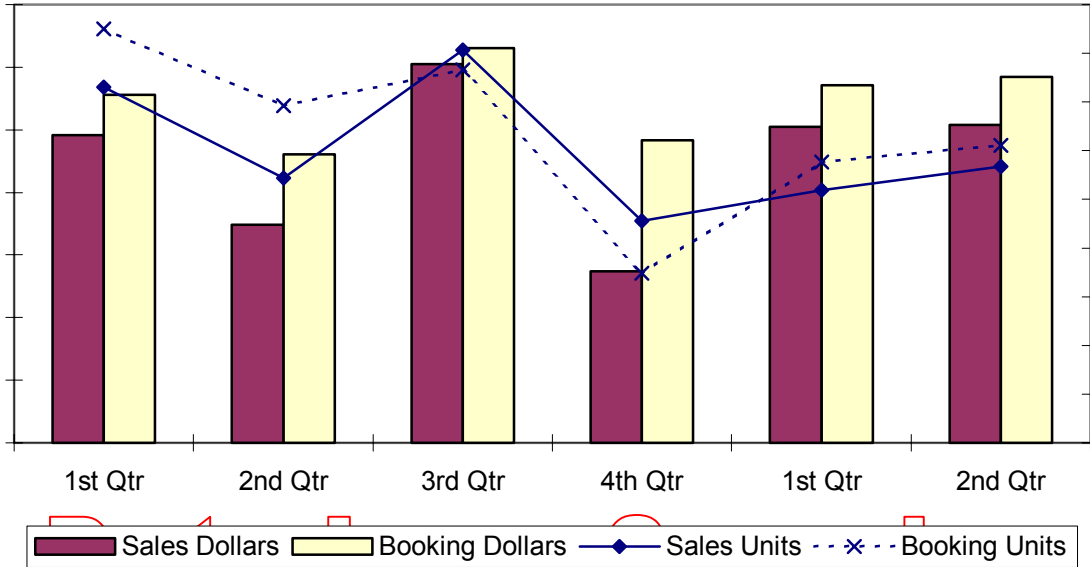
**CY 2005/2006 PCB Mount,  $>2$  - 20A, SS Relay Prices**



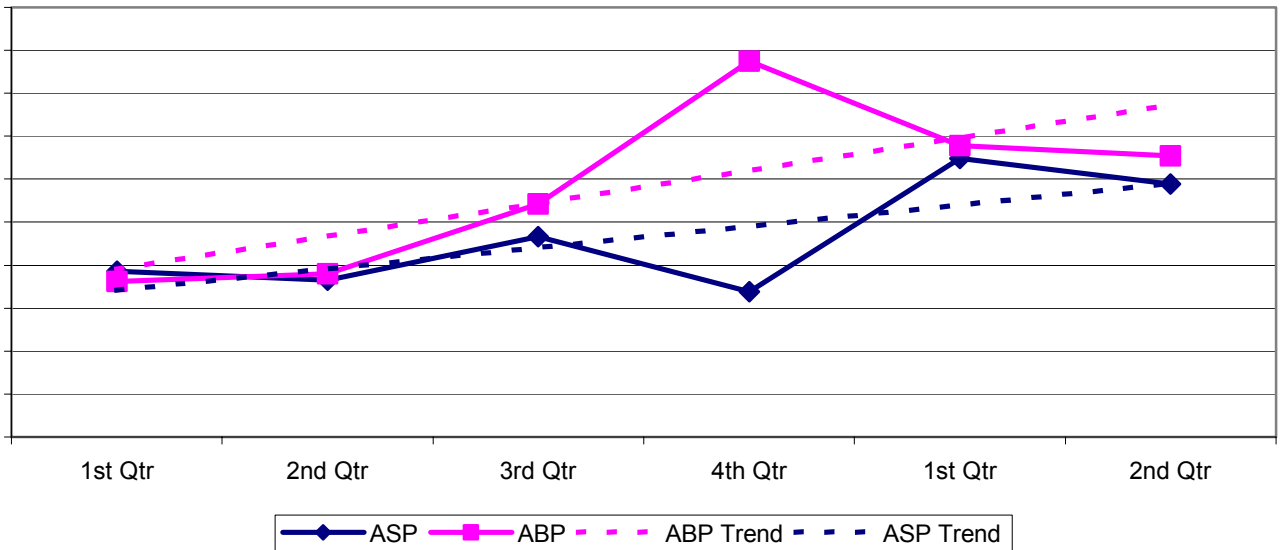


The smallest SSR category, low amperage panel/plug-in, appears to have steady sales dollars with three quarters around \$XXXX and three quarters varying above and below this level. Booking dollars are similar and at a slightly higher level. Units seem to be headed lower resulting in an improving ASP and ABP

**CY 2005/2006 Total Panel/Plug-In Mount, >2-20A, SS Relay Sales & Bookings**

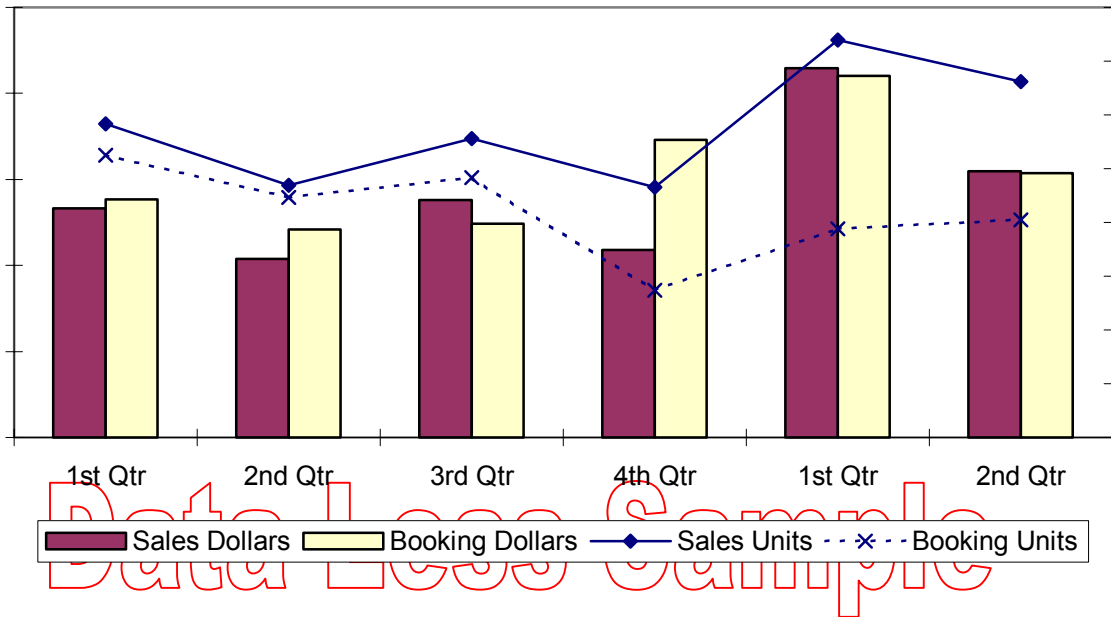


CY 2005/2006 Panel/Plug-In Mount, >2 - 20A, SS Relay Prices

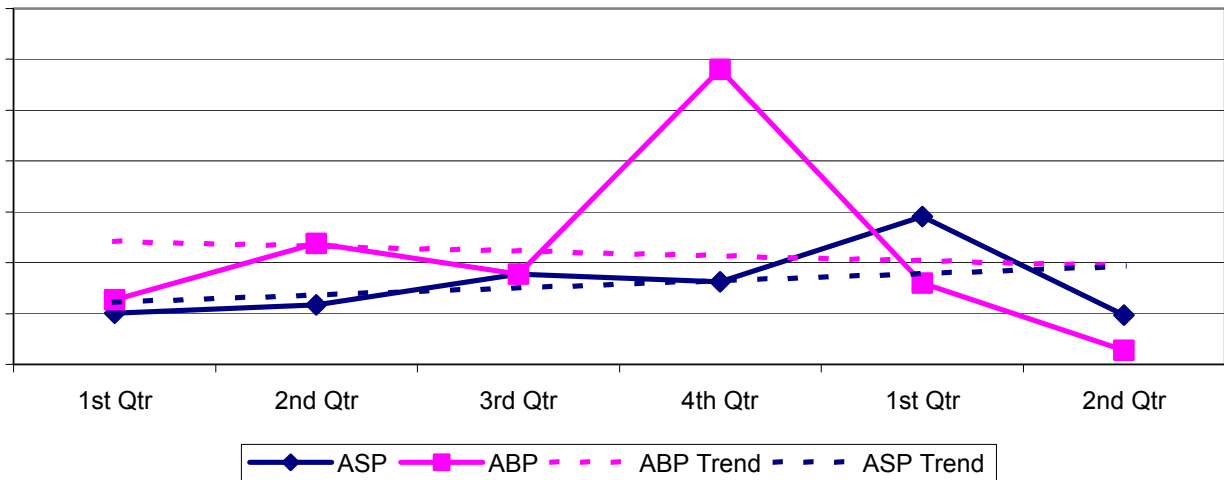


High amperage panel/plug-in SSR's peaked in sales units and dollars in the first quarter of this year. Booking dollars also rose to a peak Q1 from Q2 of last year, as units went lower. During this transition the ABP price spiked in Q4 but is generally headed lower. ASP's, on the other hand crept up until they dropped in Q2 of this year.

**CY 2005/2006 Total Panel/Plug-In Mount, >20 - 30A, SS Relay Sales & Bookings**



**CY 2005/2006 Panel/Plug-In Mount, >20 - 30A, SS Relay Prices**



**Q2 CY 2006 Total Reported Solid State Relay Data**

<u>Sales</u>	<u>2<sup>nd</sup> Qtr</u>	<u>Bookings</u>	<u>2<sup>nd</sup> Qtr</u>	<u>Ratios</u>	<u>2<sup>nd</sup> Qtr</u>
<b>PCB &gt;2 – 20A</b>		<b>PCB &gt;2 – 20A</b>		<b>PCB &gt;2 – 20A</b>	
Sales Dollars	\$XXXXXX	Booking Dollars	\$XXXXXX	Book to Bill \$'s	XXXX
Sales Units	XXXXX	Booking Units	XXXXX	Book to Bill Units	XXXX
ASP	\$XXXX	ABP	\$XXXX	ABP to ASP	XXXX
<b>Panel/Plug-in &gt;2 – 20A</b>		<b>Panel/Plug-in &gt;2 – 20A</b>		<b>Panel/Plug-in &gt;2 – 20A</b>	
Sales Dollars	\$XXXXXX	Booking Dollars	\$XXXXXX	Book to Bill \$'s	XXXX
Sales Units	XXXXX	Booking Units	XXXXX	Book to Bill Units	XXXX
ASP	\$XXXX	ABP	\$XXXX	ABP to ASP	XXXX
<b>Panel/Plug-in &gt;20 – 30A</b>		<b>Panel/Plug-in &gt;20 – 30A</b>		<b>Panel/Plug-in &gt;20 – 30A</b>	
Sales Dollars	\$XXXXXX	Booking Dollars	\$XXXXXX	Book to Bill \$'s	XXXX
Sales Units	XXXXX	Booking Units	XXXXX	Book to Bill Units	XXXX
ASP	\$XXXX	ABP	\$XXXX	ABP to ASP	XXXX
<b>Totals</b>	<b>\$XXXXXX</b>	<b>Totals</b>	<b>\$XXXXXX</b>	<b>Total</b>	<b>XXXX</b>
Sales Dollars	XXXXX	Booking Dollars	XXXXX	Book to Bill \$'s	XXXX
Sales Units	\$XXXX	Booking Units	\$XXXX	Book to Bill Units	XXXX
ASP	\$XXXXXX	ABP	\$XXXXXX	ABP to ASP	XXXX

Data Less Sample

**Hot Topic**

**New Process Produces Non-Silicon Based MEM's Relays**

HT MicroAnalytical Inc. (HT Micro) of Albuquerque NM is developing micro-fabricated electro-mechanical relays. Initially, HT Micro is focused on low frequency applications, but plans subsequent relays that operate well into the RF. HT Micro's relays are small surface mount devices with a footprint of 3X5 mm, which is approximately the same as the current RF-MEMS relays. However, they are electro-mechanical with a 1.5-volt actuation signal and present nearly as much contact force as a conventional small PCB mount relay. In a very small footprint, they have a measured carry current of over 2 amps DC. Both mechanically latching and non-latching relays can be produced, both with normally open and/or normally closed contacts.

**What's Different?**

HT Micro's relays are fabricated using additive metal processing on a ceramic filled-via wafer. The resulting relays consist entirely of ceramic, copper and gold with high force metal springs and use

established contact metallurgy. The packaging is a hermetic metal & ceramic structure with integral surface mount pads. Since the packaging is performed entirely at wafer scale and is an integral portion of the total fabrication process, the cost is quite low. The resulting relays are competitive in every way with existing electromechanical relays but offer significant size advantages and are expected to offer very significant cost advantages in high rate production. Because of the high contact forces, measured at over 80 milliNewtons, contact stiction does not present the same issues as for silicon based MEMS relays that typically have only 100 microNewtons of contact force. Conventional contact metallurgies can be employed enabling hot switching in many applications.

### **What is the “Additive Metal” Fabrication Process?**

This is a lithographic based micro-fabrication process that uses a plastic mold form to define the metal components used in the relay. The process can accommodate insulators, conductors, and ferromagnetic materials as required for a high performance electro-mechanical relay. Packaging is integral to the process resulting in a very low cost of manufacture.

### **How Broadly Applicable Is This Process?**

Products currently in development at HT Micro include not only relays, micro-connectors and other micro-electronics components, but also ion optics for a miniaturized mass spectrometer, implantable gold medical devices, impact switches, surety components including both safe and arm and arm/fire devices, and a number of other components in these or nearby market verticals

### **What Are The Next Steps Specific To Relays?**

HT Micro intends to complete a second design iteration of its current prototype relays and then offer them for test to selected customers. It also plans to fabricate relay arrays in a single BGA package with 32 and 64 relays per package. Because of very low NRE costs for layout modifications in such a package, the relay arrays will be offered with low cost custom internal layout and interconnect options based on relatively small production runs. Future plans also call for high power relays that operate up to 10-20 GHz allowing both transmit and receive side switching for communications applications as well as facilitating automatic test applications with higher power signals.

### **How Keep To Innovation Alive**

Introducing innovative new products and processes is the most important activity for any manufacturer. It truly provides an opportunity to differentiate themselves from competitors and permits them a premium price for the period it takes for like products to be introduced, if they even can be. Many manufacturers work closely with individual customers to develop niche products for specific applications. The resulting new new product may not have larger market appeal or the customer may be able to restrict the sale of the product to others. This method of product development may limit risk as well as reward. More development of innovative new products or processes, like the one described above is needed to keep the relay business prospering.

## Industry News

### American Zettler

#### **Slim package, High Sensitivity, 6 Amp Power Relay**

**Aliso Viejo, California** - American Zettler, Inc. introduces the AZ6991 relay, the newest addition to its family of high quality subminiature power relays. The AZ6991 relay provides power and sensitivity in a small slim package. Ideally suited for use where an extremely narrow interface element is needed as in timers, PLCs, I/O modules and I/O ports. Only 5 mm wide, the AZ6991 relay has a UL/CUR rated switching capacity of 6 Amps at 277 VAC, 6 Amps at 30 VDC and a R300 Pilot Duty rating.

Available in 1 Form A or 1 Form C versions the AZ6991 features a 4000 Vrms contact to coil dielectric strength, 6 kV surge rating and 8 mm creepage and clearance distances. Coil voltages are from 3 Vdc through 60 Vdc with a nominal sensitivity of 170 mW and a pull-in sensitivity of only 95 mW.

The AZ6991 is available epoxy sealed so it may be wave soldered and washed. It has silver nickel contacts with gold plating available. The AZ6991 measures 28 x 5 x 15 mm and operates over the range of -40 to +85°C, and is fully RoHS compliant.

Pricing starts at \$ 1.50 at 1000 pieces.

Data Less Sample

#### **Potential Relay Series**

**Aliso Viejo, California** - American Zettler, Inc. announces the ZCPR Series as its latest offering in our growing line of products for the industrial market. This series of potential relays is used to assist in the starting of single-phase motors, which employ start capacitors for high torque. Common applications include air conditioning, commercial refrigeration, heat pumps and more. The coil of a potential relay is energized by the potential of the start winding. When this voltage is raised to the pick up value the contact will open and disconnect the start capacitor. The relay will remain energized until the start winding voltage is removed or decreases below the drop out value.

- Class B (130°C)° insulation system
- 50 & 60 HZ at various voltages from 120V to 380V
- 50A contact rating
- Various operating positions and mounting styles available
- Large silver cadmium oxide contacts
- UL/CUR approved

For pricing please contact the factory.

### Miniature Power Relays With AC Coils

**Aliso Viejo, California** - American Zettler, Inc. has just announced the availability of AC coils for their family of power relays, the AZ761, AZ762 and AZ743 Series. Now available with 24, 115 and 230 VAC coils these relays have switching capabilities to 16 Amps in the single pole configuration and 8 Amps in the double pole configuration. With isolation spacing of 10 mm and dielectric strength of 5000 Vrms, they have complete UL, CUR and VDE approvals. AC coil power is only 0.76 VA with DC coil power at 400 mW and with Class F insulation and a seated height of 15.7 mm, these relays are ideal for many HVAC and white goods applications.

Pricing starts at \$2.81 at 1,000 pieces.

### Subminiature Signal Relay

**Aliso Viejo, California** - American Zettler, in continuing its tradition of excellence, introduces the AZ8462 Series relay. The AZ8462 has a DPDT contact arrangement with DIP or SMT mounting. Features include the option of single-side stable or latching single or dual coil, heavy-duty bifurcated contacts and RoHS compliance. The low power consumption and latching option makes the AZ8462 the prime choice for battery-powered applications. The AZ8462 has a surge withstand voltage up to 2500 and a high contact capacity of 2 Amps at 30 VDC. Stable contact resistance makes AZ8462 the optimum choice for lower level signal switching.

Pricing starts at \$.93 at 1000 pieces.

### 8 Amp Subminiature Power Relay

**Aliso Viejo, California** - Expanding an impressive list of intermediate range power relays, American Zettler, Inc. introduces their AZ881 series relays. This relay has many features demanded by engineers designing HVAC, alarm systems, industrial controls, office equipment and consumer products. Valuable features include latching and non-latching versions (single or dual coil), 1 Form A, 2 Form A or 1 Form A, 1 Form B contact arrangements, low power consumption of 150 mW and a high dielectric strength of 3000 Vrms (5000 V surge) from contact to coil.

The AZ881 is available with standard Class B insulation with Class F insulation optional. Other AZ881 versions offer gold plated contacts, epoxy sealed or flux tight construction and reversed polarity coils. The AZ881 is UL rated for 8 amps at 250 VAC, 5 amps at 30 VDC and 1/6 HP at 250 VAC and is fully RoHS compliant.

Pricing starts at \$ 2.61 at 1000 pieces

### 4 Amp Mini-SIL Solid State Relay

**Aliso Viejo, California** – American Zettler Inc. introduces the latest series addition to our SIL package Solid State Relays. The SGX-41F pin-out is compatible with the standard OAC type I/O module with models that can switch loads up to 4A at voltages up to 400 Vac. The SGX-41F also has options of: input voltage, a choice of 3-15VDC or 15-32 VDC and turn-on, zero-cross or random-phase. Features include an internal snubber, dual SCR AC or TRIAC AC output, and a maximum blocking voltage of 800 Vpk. The SGX-41F is an environmental friendly relay with RoHS compliance. The SGX-41F has a minimum off-state (dv/dt) capability of at least 500 V/ $\mu$ s, thanks to the superior optional SCR output circuitry. Additional features include: high surge capacity and a 4000 VAC dielectric strength between input and output. The SGX-41F Series is manufactured in our ISO9001 factory for optimum performance and reliability.

Pricing starts at \$4.96 at 1000 pieces

## Teledyne

### **Teledyne Relays Announces Series A152 High Repeatability Ultraminiature Broadband Attenuator Relays**

HAWTHORNE, Calif. (March 20, 2006) - Teledyne Relays has introduced the Series A152 family of highly repeatable, ultraminiature broadband attenuator relays for attenuating RF signals in 50-ohm and 75-ohm systems over a frequency range from DC to 4 GHz.

The low profile and small grid spacing of the A152 relays makes them ideal for use when packaging density is a prime consideration. The A152 relays offer a both a normally closed low-loss, bypass path and an attenuation path. The built-in functionality eliminates the need for additional external resistors.

These single-section, switchable attenuator relays have an internal matched thin film attenuator pad in a "Pi" configuration. Relays are available with a fixed 20 dB attenuation value. Other values ranging from 1 to 16 dB are available upon request.

The A152 relays feature high repeatability ( $\pm 0.1$ db), high resistance to electrostatic discharge, flat amplitude versus frequency response, high isolation between control and signal path, stable attenuation versus temperature and excellent phase linearity.

The A152 relays incorporate a unique uni-frame motor design that provides high magnetic efficiency and mechanical rigidity. Minimum mass components and welded construction provide maximum resistance to shock and vibration.

The relays are manufactured with advanced cleaning techniques to assure internal cleanliness. They feature gold-plated, precious metal contacts, which provide excellent intermodulation performance. The A152 is RoHS compliant.

The A152 hermetic canister measures .375 x .510 x .295 inch (9.53 x 12.96 x 9.49 mm) and weighs .11 ounce (3.2g). Leads measure a minimum of 0.7 inch (17.78 mm).

The A152 is priced at \$35.44 each in quantities of 500 units. Lead time for delivery is stock to 14 weeks.

## Tyco Electronics

### **Tyco Electronics To Acquire the Relay Segment of Robert Bosch GmbH**

**BENSHEIM, Germany** - December 27, 2005 -- Tyco Electronics is to acquire the automotive relay business of Robert Bosch GmbH subject to anti-trust regulatory approvals. This business is to be integrated into the relay segment of Tyco Electronics Global Automotive Division and will be transferred to the Tyco Electronics Automotive Relays Competency Centre in Evora / Portugal.

The acquisition of these product lines provides an excellent platform for Tyco Electronics for the expansion of the 24 V businesses for trucks and busses, in the high current segment as well as in the spare part and retrofit markets, in which Bosch will continue to act as the sales channel for Tyco Electronics.

Tyco Electronics, a business segment of Tyco International Ltd., is the world's largest passive electronic components manufacturer; a leader in cutting-edge wireless components, complete power systems, and premise wiring components and systems; and a provider of critical communications systems to the Land Mobile Radio industry



## Appendix “A”

# Data Less Sample

### Electromechanical Relays

	American Zettler	CIT	Omron	Panasonic	Tyco
<b>Signal Relays ≤ 3A</b>	AZ5, AZ8, AZ420, AZ830, AZ832, AZ849, AZ850, AZ851, AZ852, AZ853, AZ954, AZ956, AZ957, AZ961, AZ991, AZ8222, AZ8461	J102-1A, J103, J104, J850	G2E, G5A, G5S, G5V1, G5V2, G6A, G6H, G6H2F, G6S, G6K, G6J, G6E, G6G, G6L, G6T, G6F,	AGN, AGQ, ASX, TX, TQ, TN, DF, HY, DS, RE, RJ, RK, RX, RA, RP	IM, P2 (V23079), FX2, FT2/FU2, FP2, MT2, D2n (V23105), W11 (V23101), P1 (V23026), V23100-V4, Cradle N (V23154/V23162), Cradle W (V23005), Cradle S (V23054), Cradle P (V23003), Card SN (V23030), 190, T81, TSC, OUAZ, JWS, JWD, OL, OMR, 159/160, PCN, R10
<b>PCB Mount &gt;3 – 20A</b>	AZ164, AZ166, AZ420, AZ673, AZ696, AZ697, AZ733, AZ734, AZ742, AZ743, AZ756, AZ761, AZ762, AZ763, AZ764, AZ765, AZ766, AZ767, AZ770, AZ920, AZ939, AZ940, AZ942, AZ943, AZ946, AZ975, AZ976, AZ6951, AZ6961, AZ6962, AZ9321, AZ9431, AZ9481, AZ9621	J102-3A~5A, J105, J105E, J098, J099, J107F, J109F, J111, J112K, J113, J114AF, J118, J120, J121, J123F	G5NB, G5S, G5J G5B, G5C, G5SB, G6B, G6C, G6D, G6M, G5Q, G5PA, G5PB, G5LA, G5LB, G5LC, G5LE, G5LN, G6RN, G5CA, G5CE, G2RG, G2RL, G5RL, G4A, G4B, G4W, G4X	JS, JQ, PE, PA, PQ, NC, DSP, DK, DJ, DE, ST, SP, SF, LF, LE, LZ, LJ, LA, LK, JVN, JW, JC, JM, CP, CJ, CT, CF, CQ, CR	PE, RE, SNR (V23092), RYII, T75, PCJ, PCH, T77, OJ/OJE, PCD/PCDF, PB, U/UB (V23148), T73, OUDH, T7N, PCE, ORWH, T7C, SRUDH, SRUJH, SRUT, RT, 429, OMI/OMIH, OMI 2 pole, OMIT, OMIF, PCI, OSA, OSZ, SDT, SDT-R, PCK, Card E (V23057), RPII/2, RPII/1, RP3SL, IF (V23077), 410, PCG, 430, 600, RF, SR2M (V23047), SR4D/M, SR6D/M, SR6 (V23050), SR6-Sensitive, MSR (V23061), LN/LNH, RX, 496, 596, CDR
<b>PCB Mount &gt;20 – 30A</b>	AZ755, AZ756, AZ757, AZ760, AZ769, AZ934, AZ935, AZ942A, AZ975, AZ976, AZ984, AZ987, AZ988, AZ989, AZ2110, AZ2120, AZ2150, AZ2200, AZ2270, AZ2700, AZ2705, AZ2800, AZ2850	J115F1, J115F2, J119	G8P, G7LP, G7JP,	JTN, JTV, CM, CB, CA, DQ	PCF, T90, T9A, 491, T92, T9C, 590
<b>Panel/Plug-In &gt;3 – 20A</b>	AZ164, AZ166, AZ420, AZ760, AZ756, AZ757, AZ2300, AZKUP	J151, J152	MK, MY, LY, G2R(S), G8P, MY4H	HN, HJ, HC, HK, HL, HP, HG	KH, PCL, PT, K10, KUP, KCP, RM2/3/7, KUEP, KUIP, KUGP, RM5/6, KUMP, KUP93, KRP, KRPA, MT, KA, 419, KUL, KB/KBP, S89/90, S86/87, ST, SR6Z, 155, 156, 157, 158, 258
<b>Panel/Plug-In &gt;20 – 30A</b>	Z756, AZ757, AZ760, AZ769, AZ973, AZ977, AZ2110, AZ2120, AZ2270, AZ2280, AZ2700, AZ2705, AZ2800, AZ2850	J115F3	G7Z, MGN, MJN, G7L-T//B, G7J-T/B, G9E-CA, G9E-B	HE, JH, CBAEP, AEV, AEJ, AEB	KRP-3H, RM8, KUHP, RMC/D, PRD, 9400, 9100, 38, 187, 188

**Solid State Relays**

	<b>American Zettler</b>	<b>CIT</b>	<b>Omron</b>	<b>Panasonic</b>	<b>Tyco</b>
<b>PCB Mount &gt;2 – 20A</b>	SGC, SGX		G3MB, G3MC, G3DZ, G3S, G3CM, G3TB, G3TC, G3PA G3PB, G3R	AQG, AQB, AQ8, AQF, AQ1	OACM, ODCM, OAC, ODC
<b>Panel/Plug-In &gt;2 – 20A</b>	SGX		G3R(S), G3R(D), G3NE, G3NA	AQK, AQN, AQR	
<b>Panel/Plug-In &gt;20 – 30A</b>	SG		G3NA-x25+	AQK, AQN, AQR	SSR, SSRT, SSRD, SSRQ