

SP25M compact scanning probe system

SP25M scanning probe

Only 25 mm (0.98 in) in diameter, and with a range of modules for high performance scanning and touch-trigger probing, the SP25M is the world's most compact and versatile scanning probe system.

The SP25M is actually two sensors in one, enabling scanning and touch-trigger probing in a single probe system. SP25M gives highly accurate scanning performance with stylus lengths from 20 mm to 400 mm (0.79 in to 15.75 in) using M3 stylus range. In addition, the ability to carry Renishaw's TP20 range of touch-trigger stylus modules means that the SP25M system enables best optimisation of the measurement solution to suit the application.

The SP25M's compact size and autojoint mounting make it compatible with the PH10M/MQ motorised probe heads and PH6M fixed probe head. It can also be mounted on a multiwired extension bar of up to 100 mm (3.94 in) length. Together, this combination permits excellent reach and access to part features.

A unique pivoting design achieves exceptional dynamic performance. Four scanning modules have been designed to optimise scanning accuracy across a wide range of stylus lengths, avoiding most of the deterioration in performance seen in other types of scanning probe as stylus lengths increase.

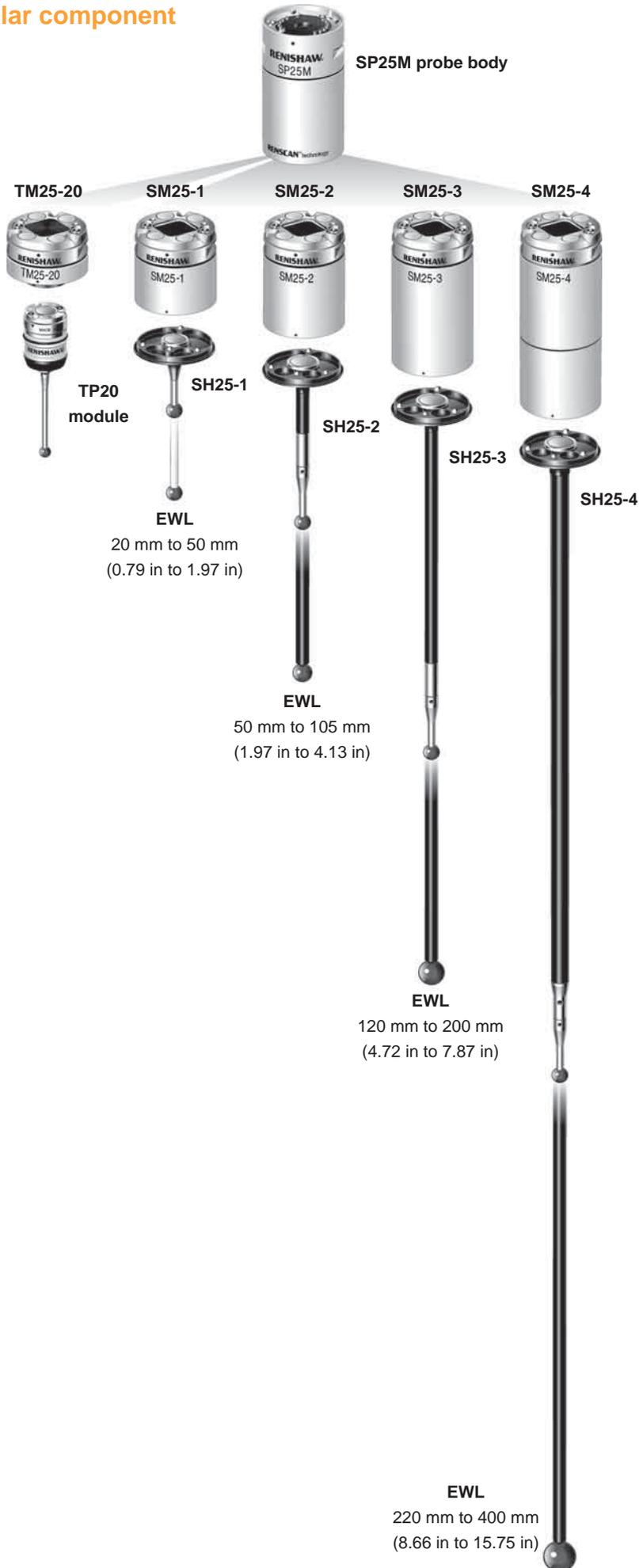


SM25-4 module can scan very deep features - shown here with 400 mm (15.75 in) stylus

SP25M features and benefits:

- The world's most compact and versatile scanning probe system
- Two sensors in one - a scanning probe, and a touch-trigger probe using TP20 stylus modules
- Rapid and repeatable interchange between highly modular system elements provides the most efficient solution to suit the measurement task
- Excellent scanning accuracy across the entire stylus range of 20 mm to 400 mm (0.79 in to 15.75 in)
- Can be used with extension bars up to 100 mm for even greater reach
- Probe can be mounted on an articulating head, allowing access to many features with fewer styli
- Ultra-compact at $\varnothing 25$ mm ($\varnothing 0.98$ in) for superior part accessibility
- Isolated optical metrology technology gives unrivalled measurement performance, even with long styli
- Flexible change rack where ports can be easily configured to carry any system element
- Bump-stop crash protection in the Z axis, together with a detachable stylus holder for XY crash protection
- Low-cost, entry level kits available with ability to easily expand the system

SP25M modular component system



EWL
 220 mm to 400 mm
 (8.66 in to 15.75 in)

EWL - effective working length

The SP25M system components

The SP25M probe body, which houses the isolated optical metrology transducer system, has autojoint compatibility with Renishaw's PH10M/MQ, and PH6M probe heads, extension bars and ACR1/3 sensor changers.

A range of four scanning modules SM25-1/-2/-3/-4 has been designed to provide optimised scanning performance over their specified stylus length ranges. The SP25M's innovative pivot-action motion, and the isolated optical metrology approach, mean that excellent accuracy is achieved over the entire stylus length range of 20 mm to 400 mm (0.79 in to 15.75 in).

SH25-1/-2/-3/-4 stylus holders provide the flexibility to have multiple stylus set-ups for each scanning module. The detachable stylus holder is located on the scanning module using a repeatable magnetic kinematic joint. It provides automatic stylus changing capability and directly carries Renishaw's M3 stylus range.

It is also possible to carry Renishaw's TP20 range of touch-trigger probe modules by using the TM25-20 adaptor module mounted on the SP25M probe body.

Rapid and repeatable interchange between all system elements allows easy selection of best probe solution. This can be automated to maximise productivity by using the FCR25 flexible change rack.

The SP25M can be connected directly to the **UCC2** controller while a daughtercard permits use with Renishaw's UCC1 controller. The AC3 interface card allows integration with other controllers.

Using SP25M as a scanning probe:

The probe body has one of the four scanning modules attached (SM25-1/-2/-3/-4) which have matching stylus holders (SH25-1/-2/-3/-4). Each combination is optimised to maintain high accuracy and low contact forces over their dedicated range of effective stylus lengths. These are:

- SM25-1 + SH25-1 = 20 mm to 50 mm (0.79 in to 1.97 in) EWL
by use of 20 mm to 50 mm (0.78 in to 1.97 in) stylus
- SM25-2 + SH25-2 = 50 mm to 105 mm (1.97 in to 4.13 in) EWL
by use of 20 mm to 75 mm (0.78 in to 2.95 in) stylus
- SM25-3 + SH25-3 = 120 mm to 200 mm (4.72 in to 7.87 in) EWL
by use of 20 mm to 100 mm (0.79 in to 3.94 in) stylus
- SM25-4 + SH25-4 = 220 mm to 400 mm (8.66 in to 15.75 in) EWL
by use of 20 mm to 200 mm (0.79 in to 7.87 in) stylus

Using SP25M as a touch-trigger probe:

The probe body has the TM25-20 adaptor module attached, which directly carries any of Renishaw's TP20 range of stylus modules:

- TP20 LF/SF/MF/EF
- TP20 EM1/EM2
- TP20-6W

Interfacing options

SP25M can be integrated:

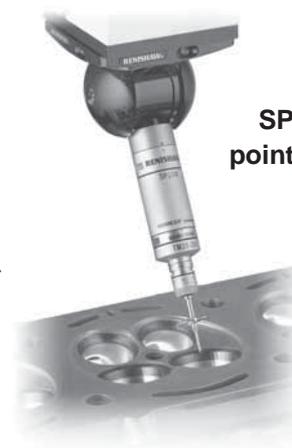
- directly using the **UCC2** controller (requires scanning upgrade)
- by using Renishaw's UCC1 controller (requires scanning upgrade) together with a SP25M/UCC1 daughtercard
- by using Renishaw's AC3 interface card (ISA Bus) within the machine builder's controller



SP25M with
100 mm (3.94 in)
extension bar
between PH10
head and probe
body



SP25M scanning



SP25M taking
points with a TP20
module

Automation using the FCR25 flexible change rack

The full potential of the SP25M system is realised when the measurement routine is automated using the FCR25 flexible change rack, a passive triple-port unit capable of storing any of the system elements.

The FCR25 port stores the SM25-1/-2/-3/-4 and TM25-20 modules, but can instantly be configured to store the SH25-1/-2/-3/-4 stylus holders or TP20 modules by using the appropriate port adaptor insert: PA25-SH (for SH25-1/-2/-3/-4) or PA25-20 (for TP20 modules).

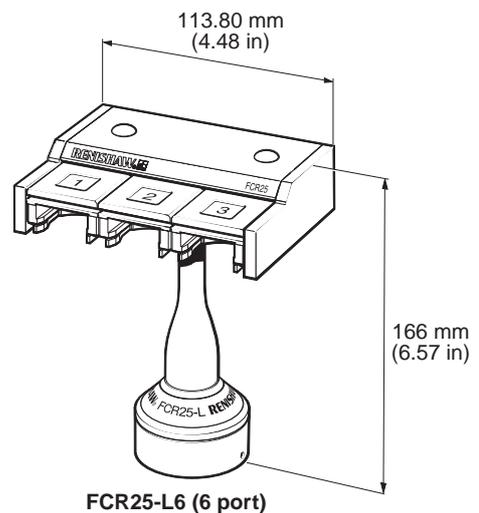
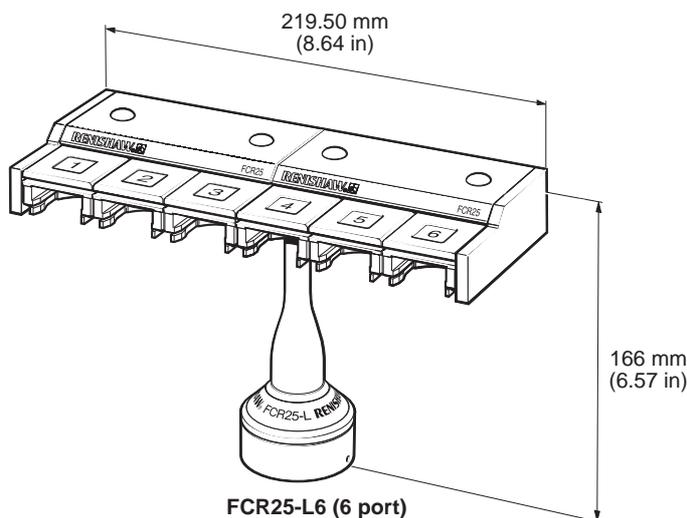
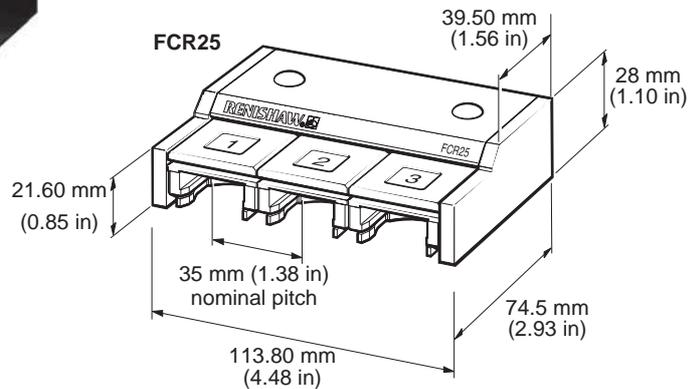
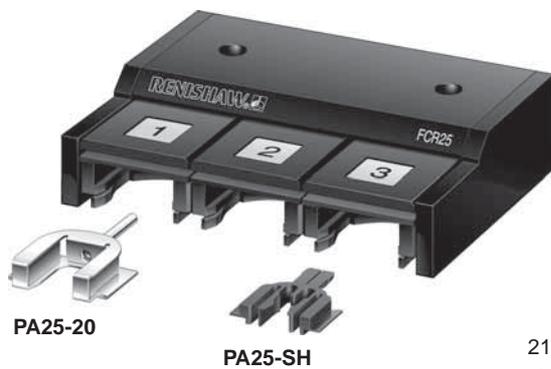
The FCR25 mounts directly on Renishaw's MRS modular rack system for multiple port solutions (3, 6, 9, 12, 15 etc). Alternatively, there are the FCR25-L3 (3 port) and FCR25-L6 (6 port) stand-alone rack variants that are ideal where machine space is limited.

Probe maintenance

CK200 (Renishaw part number A-1085-0016) is a specialised cleaning material, for the removal of contamination from the location faces of the magnetically retained kinematic couplings of the TP20, TP200 and SP25M probe systems. The frequency of cleaning should be determined according to the conditions of use.

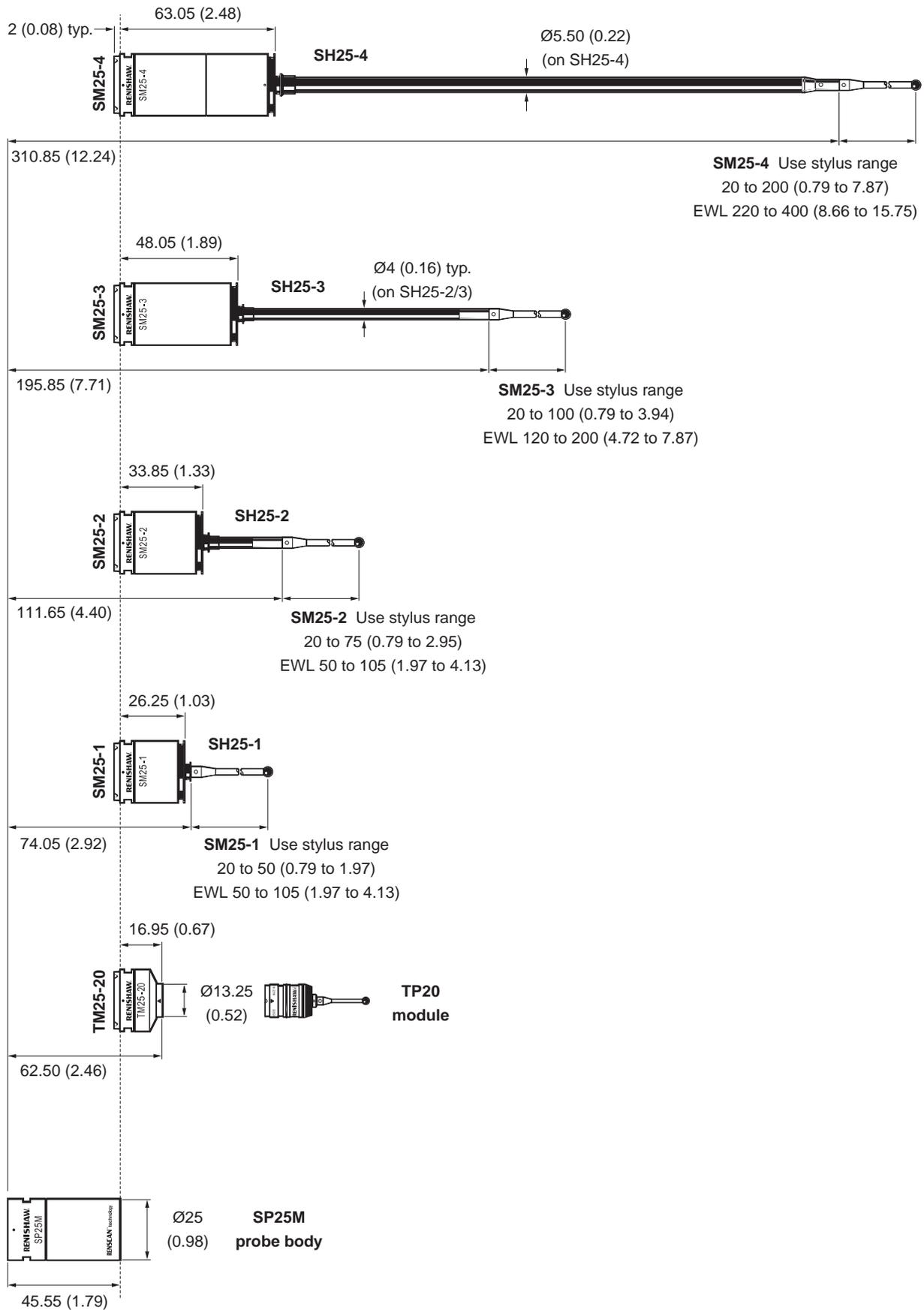


FCR25's mounted to the MRS



SP25M system component dimensions

dimensions mm (in)



Specification summary	SP25M	
PROBE ATTRIBUTES	Scanning with 3-axis measurement (X, Y, Z) Touch-trigger probing using TP20 modules *	
MEASUREMENT RANGE	±0.50 mm (0.02 in) deflection in all directions in all orientation	
OVERTRAVEL RANGE (nom)	X, Y = ±2 mm (±0.08 in) min, +Z - 1.70 mm (0.07 in), -Z = 1.20 mm (0.05 in)	
RESOLUTION	Capable of <0.10 µm (<0.00004 in)	
SPRING RATE	Nominally 0.60 N/mm - when using modules shortest specified stylus Nominally 0.20 N/mm - when using modules longest specified stylus	
PROBE DIMENSIONS	Ø25 mm x length dependent on module used (see schematic on previous page)	
WEIGHT	SP25M body	60 g (2.12 oz)
	SM25-1 scan module	35 g (1.24 oz) including SH25-1 but excluding stylus
	SM25-2 scan module	40 g (1.41 oz) including SH25-2 but excluding stylus
	SM25-3 scan module	49 g (1.73 oz) including SH25-3 but excluding stylus
	SM25-4 scan module	71 g (2.50 oz) including SH25-4 but excluding stylus
	TM25-20 TTP module	40 g (1.41 oz) including TP20 SDT module but excluding stylus
EFFECTIVE STYLUS LENGTH RANGE (Always observe the specified stylus range for the scanning module being used)	SM25-1 + SH25-1 = EWL 20 mm to 50 mm (0.79 in to 1.97 in) using 20 mm to 50 mm stylus	
	SM25-2 + SH25-2 = EWL 50 mm to 105 mm (1.97 in to 4.13 in) using 20 mm to 75 mm stylus	
	SM25-3 + SH25-3 = EWL 120 mm to 200 mm (4.72 in to 7.87 in) using 20 mm to 100 mm stylus	
	SM25-4 + SH25-4 = EWL 220 mm to 400 mm (8.66 in to 15.75 in) using 20 mm to 200 mm stylus (Uses Renishaw's M3 range of styli)	
MOUNTING	Multiwired autojoint - compatible with PH10M/MQ and PH6M probe heads, extension bars and ACR1/3 sensor changers	
CRASH PROTECTION	±X, ±Y, -Z via break out of module or stylus holder +Z via integral bump-stop design	
SIGNAL OUTPUTS	Non-linear and non-orthogonal analogue outputs - rate, gain and resolution are not fixed	
POWER SUPPLY	+12 V (±5%), -12 V (+10 / -8*), 5 V (+10% / -13%) dc at probe	
PROBE CALIBRATION	Requires that a non-linear, third order polynomial calibration is used	
CHANGE RACK OPTIONS	FCR25	Triple port unit(s) which mount to MRS
	FCR25-L3/6	3/6 port standalone racks
INTERFACE OPTIONS	Directly into UCC2 (requires scanning upgrade) or into the UCC1 using an SP25M/UCC1 daughtercard (scanning upgrade required) or AC3 interface card. Interface for TP20 also required if applicable (see page 3-6)	

* **NOTE:** Please refer to page 3-4 for TP20 specification information.



SP25M's modular design approach is the key to high accuracy and user flexibility