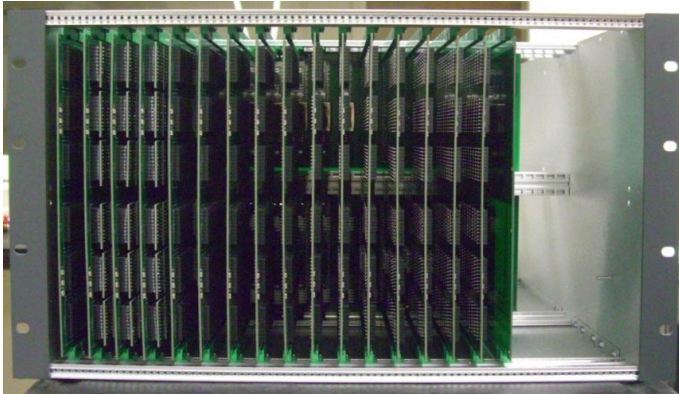


Dynamic Shimming Technology

DSU-32 Real Time DSU ECC

For investigational use only

Dynamic Shimming Update with Shim Induced Eddy Current Compensation



The Load&Go™ shimming technology allows for dynamic shim updating and real time shimming on multiple slices, voxels or regions of interest with simultaneous compensation of shim induced eddy currents.

The Challenge

Cancellation of local imaging artifacts caused by air/tissue interfaces

Imaging at high fields where efficient compensation of the subject's magnetic susceptibility is essential

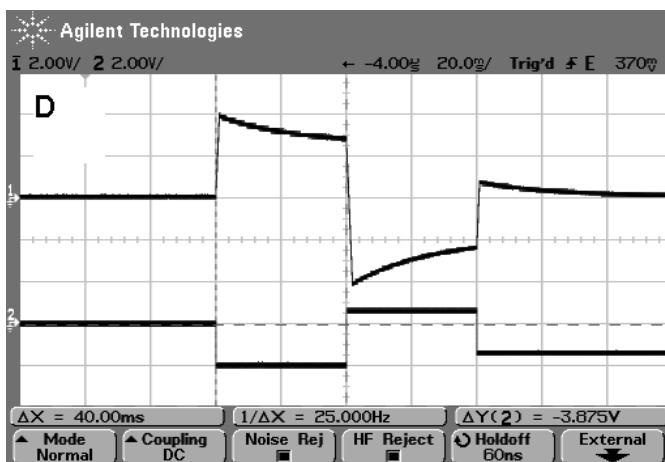
Compensation of de-shimming due to respiratory or cardiac motion

Correction of thermal drift of ferro-magnetic (passive) shims

Compensation of Shim Induced Eddy Current – a One-Time Setup

A one-time setup enables the DSU shim induced eddy current compensation capabilities. Individual shim characteristics of each scanner are measured during the setup. Initially data is acquired on shim induced eddy currents; their self time constants together with B0 offset and associated time constants are then calculated and all data are stored in the Load&Go™ non-volatile memory.

Dynamic Shim Update – Customized Settings for each Patient



User interface parameters: time constants, amplitudes and ramping times

A 3D B0 map of the target region is acquired and decomposed into its spherical harmonics constituents; their composition is then analyzed and optimized shim values for each slice are calculated.

The imaging system downloads each slice settings into a separate file in the Load&Go™ system.

The console sequence control is programmed to generate a TTL trigger synchronously with image acquisition of a given slice. The TTL pulse causes the corresponding shim file to be loaded into appropriate Digital-to-Analog Converters (DAC) and shim currents are set to the required values. This loop is repeated for each slice.

The average time for file loading is about 50 μs and shim amplifier stabilization is approximately 1 ms, with no impact on the total data acquisition time.

Real Time Shimming RTS

Ability to change shim current values instantaneously

Dynamic Shim Update DSU

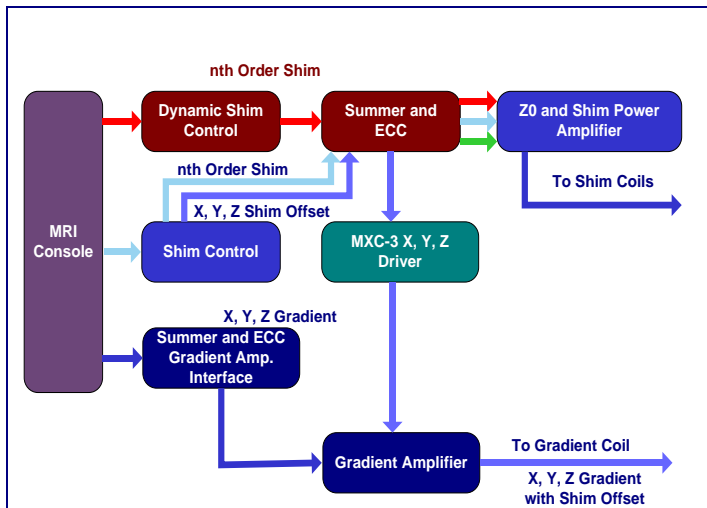
Process allowing synchronous change of shim currents as required by the imaging sequence

Eddy Current Compensation ECC

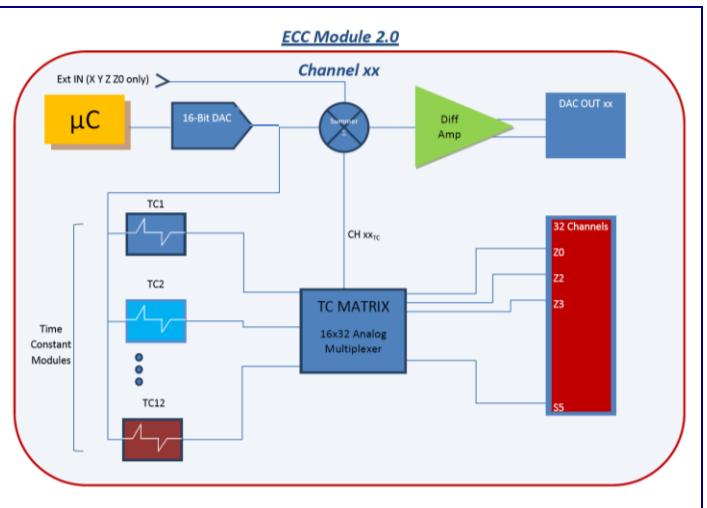
Modification of shim currents for correction of time dependent field changes after a current change

A Comparison with Standard Technology

Dynamic Shim and Gradient Control via summer



Dynamic Shim Block Diagram



Specifications

Output channels	6 to 32
Offset channels (optional)	4 (X, Y, Z, Z0)
Maximum voltage output	+/-5V or +/-10V differential
GPA interface	Via MXC unit +/- 1A per channel
Packaging	19" x 4U x 24 "
AC Power	115 or 230 VAC, 50/60 Hz
Cooling system	Forced air
Setup control	RS-232
Operating control	Customer specific

Specifications Subject to Change