HIGH SPEED TUBE AND   PIPE INSPECTION SYSTEM
USING EMAT GUIDED WAVES
TO PROVIDE
100% COVERAGE
FROM
ONE SIDED ACCESS

System Description:
August 2002

CIRCUMFERENCIAL TUBE   INSPECTION SYSTEM
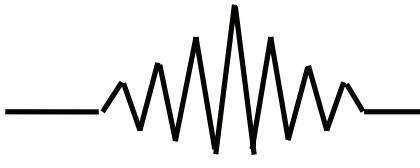
SPECIFICATIONS:

Transmitter:
1. Frequency Range: 100 KHz - 9.99MHz
2. Load Impedance: 30 - 50 Ohms
3. Tone Burst is defined by number of cycles and frequency
4. Tone Burst Cycles from 1 to 255 with software duty cycle limitation to 0.1%
5. PRF, Pulse Repetition Frequency: 1 Hz - 1000Hz in 1 Hz increments, software duty cycle limit to 0.1% duty cycle as calculated with the number of cycles in the tone burst.
6. Dual Frequency Mode: The system can be operated in single frequency mode or dual frequency mode.   In two frequency mode, two frequencies are definable with the same number of cycles in each tone burst.   The two tone bursts are generated alternatively switching from one to the other and synchronized with the hardware and software.

Receiver:
1. Non-linear gain control. Two independent gain levels switched anywhere from 0-255 usec.
2. Dual Frequency Mode can provide a different filter for each frequency.
3. Four filters available, or 2 pairs of filters for each frequency.
4. MBB, Main Bang Blanking turns off the receiver during the Tone Burst and displays an attenuated view of the transmitter output.   Controllable from 0 - 255 usec.

EMAT Probes:
1. Modular and Interchangable for Quick Field Changes for different wall pipe.
2. Self Contained with dedicated electronics built in.
3. EMAT circuits for disposable use as they wear against specimens.

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SOFTWARE: OmnEMAT 4.3

1. Analog wave form display in real time.
2. System Set-Up stored and retrieved with   Configuration Files enabling previous set-ups to be duplicated as easily as opening a file.
3. Single frequency or dual frequency independently viewed and set-up with independent TAB controls.
   Scan Types Included:
4. - Amp-Time Scan: Real Time
5. - Stacked A-Scan display, Real Time
6. – Peak Detect Scan, Real Time
7. Saving: All scans can be saved in the following manner:
   - Save to ASCII Text for graphing in a spread sheet or other analysis package.
   - Save RF to ASCII text which saves the ENTIRE RF wave forms taken during a scan.   These files may be many MegaBytes in size.
   - Save RF in binary format so the scan can be reloaded in OmnEMAT 4 and scales changes or thresholds modified.   Useful as a post-processing tool.
8. Timer based scans or Encoder based scans can be set-up.   Timer based takes data at a designated time interval from 1 Hz to over 150 Hz.   The ultimate speed is determined by the speed of the computer and the data acquisition time.
9. Encoder Based Scanning: includes a separate encoder which triggers the system to fire.   Even if the scanner is rough and jerky the scan will be smooth and capable of length measurements. Caution must be exercised to not scan too fast and exceed the duty cycle of the gated amplifier. An adjustable hardware safety is included to protect the hardware, where as excessive scan speed will only result in lost data.   Lost data is counted and the number of lost data points are displayed at the end of the scan.

COMPUTER:

1. Aluminum Lunch Box Style   Portable Computer for Field Use, or Desk Top for lab use. Current Pentium with Windows OS and MS Office for reporting.   EXCEL macros included for a semi-automated reporting.
2. System CD will be included with all pertinent software for the EMAT Inspection System.

DETECTION LIMITS:
The detection of various features are variable depending on the Guided Wave Modes Used.   A Acoustics Guide will be included to describe the various wave modes and sensitivities.
Generally Accepted Limits:
Cracking: 10% deep with the length the same as the acoustic beam.
Thinning: 0.1% over path length or 5% isolated to area diameter of acoustic beam.
Pitting: Isolated pit 20% deep with radius equal to the pit depth.