

GE Oil & Gas
Drilling & Production

Sondex* Wireline

Ultrawire™ Memory Tool

1¹¹/₁₆" , 20kpsi, 1GB Memory

Operation & Maintenance Manual



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0 ABOUT THIS MANUAL

0.1 Manual History

Date	Issue	Description	Auth	Chk	App
31/08/10	A	First Issue.	BES	CH	PR

0.2 References

Below are the manuals/links required for use in conjunction with this manual:

- Refer to the [MN-UMU001](#) manual.
- Refer to the [MN-UWMemlog](#) manual.
- Refer to the [MN-ADAPTOR](#) manual.
- Refer to: <http://www.weeerohsinfo.com/>.

0.3 Technical Help

For further technical help, contact GE Oil & Gas Technical Help as follows:

Address: GE Oil & Gas
Building X107
Range Road
Cody Technology Park
Farnborough
Hampshire
GU14 0FG
United Kingdom

Tel.: +44 (0)1252 862200

Fax: +44 (0)1252 862349

Web: <http://www.geoilandgas.com/downholetechnology>

0.4 Feedback

Please help us improve future issues of this manual by adding your comments or corrections to <http://www.geoilandgas.com/downholetechnology>, referencing the document number.

Thank You.

Documents from external sources (i.e. MSDS), supplied with/referenced in this manual, are considered the latest version at time of manual issue. However, the document can be altered by the external source without prior notice to GE Oil & Gas.

Photographs and sketches are for illustration purposes only. Depending on the tool model that you have, certain features or dimensions may differ from those shown.

1 OVERVIEW

Ultrawire™ Logging Tools can be run on a slickline or coiled tubing to acquire and store data from Ultrawire™ Production Logging and Inspection tools.

A Memory section is programmed and downloaded using an IBM® compatible PC/Laptop/Notebook that is running Ultrawire™ Memlog software (refer to the [MN-UWMemlog](#) manual), via an interface (e.g.: UMU001). Powered by a high capacity Lithium battery within a separate battery holder (e.g.: an MBH030 to MBH033), data is acquired and stored in accordance with a user defined 'profile'. This controls the sensors logged, the sampling rates and the profile scheduling.

Ultrawire™ Memlog software is supplied with memory tools to provide a graphical interface to programme the tool and/or download data from the tool, together with capabilities to merge memory tool data with depth-time files from the Depth Time Recorder (DTR).

1.1 Operating Principle

Data from the logging sensors is transmitted via the Ultrawire™ Toolbus to the memory tool at the top of the string. Data is stored in non-volatile flash memory chips under the control of a downhole processor. The tool can support all the standard GE Oil & Gas Ultrawire™ tools.

1.2 Applications

- Slickline & Coiled Tubing Production Logging.
- Production/Injection Well Profiling.
- Multifinger Imaging Tool Surveys.

1.3 Interfacing and Tool Combinations

- A suitable Memory Battery Holder (MBH).
- Supports/communicates with other Ultrawire™ Production Logging tools.
- Bottom end flowmeter or Bullnose for Ultrawire™ termination.



Figure 1.1 UMT007

1.4 Specification

Parameter	Specification	Remarks
Maximum Temperature	350°F (177°C)	---
Maximum Pressure	20,000psi (138MPa)	---
Tool Make-up Length	317.6mm (12.50")	---
Tool Shipping Length	414.3mm (16.31")	---
Diameters Available	1 ¹¹ / ₁₆ " (42.86mm)	---
Weight	5.9lb (2.7kg)	---
Supply Voltage	+12VDC to +24VDC	---
Standby Current	<4mA	---
Writing Current	15mA to 25mA	---
Tool Programming	via UMU interface box	---
Tool Downloading	via UMU up to 50MBytes/min	Computer dependent
Sample Rates	Programmable from 20ms to days in 20ms increments	Independent for each tool and each profile
Number of channels	Up to 62 tools (Ultrawire™)	---
Dual Storage Capacity	Dependent on tool type and sampling rate	64MB will record up to six Production Logging tool outputs plus pressure data at one second intervals for 100 hours
Memory Size	1024MBytes Flash Logging Memory	---
Maximum Toolbus Rate	500kbps	---
Materials	Corrosion resistant throughout	---
End Connectors:		
Top	7-pin Fischer connector (female socket)	For connection to UMU - via a lead
Bottom	4mm single conductor (female socket)	For connection to GE Oil & Gas Ultrawire™ Tools

2 SAFETY

In normal use, there are a few specific safety instructions for the safe handling of the UMT007. The information that follows is a guideline only and should be followed in addition to any specific Company and Local Rules & Regulations (Directives).

This equipment should be operated or serviced **ONLY** by qualified personnel. When the equipment is not installed, commissioned and used in accordance with the specifications of GE Oil & Gas, any protection that may have been provided may be impaired.

2.1 Hazardous Areas and 'Hot Work'



WARNING!

HAZARDOUS AREAS AND 'HOT WORK'!

This equipment may, under certain circumstances or failure modes, become a potential source of ignition.

It may be used only in Safe Areas and may not be used in classified Hazardous Areas ('Zoned' areas) unless a suitable system of work is in place (e.g.: Hot Work Permit) and appropriate precautionary measures have been followed (e.g.: monitoring for gas leaks, site inspection, fire fighting equipment, work procedures).

This must be done in accordance with local and national legislation with regard to the use of electrical equipment in potentially explosive atmospheres.

2.2 Stored Energy



WARNING!

STORED ENERGY!

The UMT007 has components that may store energy. This energy may be released at any time without warning.

Within the UMT007 there are areas that may store energy. It is possible for this stored energy to be released at any time and without warning. Refer to [Section 5.1, Relief of Trapped Pressure - Tool Disassembly](#) for information of how this stored energy can be released safely.

2.2.1 TRAPPED PRESSURE SAFETY PRECAUTIONS



WARNING!

TRAPPED PRESSURE!

The UMT007 has spaces within it that after a down hole leakage could retain trapped pressure. As this pressure can be released at any time without warning:

- Contact [GE Oil & Gas Technical Services](#) IMMEDIATELY for advice before ANY maintenance is attempted
- Make sure all trapped pressure has been removed from the UMT007 before it is transported anywhere

Wear an approved protective face shield when you handle a tool that may contain trapped pressure.

Wear an approved protective apron when you handle a tool that may contain trapped pressure.



Logging tools are subjected to harsh conditions downhole. High hydrostatic-pressure, high-temperature, shock, vibration and contact with corrosive substances can all contribute to causing possible leaks into sealed housings. Leak paths include but are not limited to:

- Permeation through the seals.
- Seal failures.
- Hairline cracks in welds.

Should such a leak occur downhole, then as the tool is removed from the well and the external hydrostatic-pressure reduces the liquid/gas that has leaked into the tool is expected to leak out again through the path by which it entered. However, some of the liquid/gas may be retained and, occasionally, the leak path may either partially or completely re-seal. This will trap the liquid/gas inside the tool. In this case, when the tool returns to the surface, it can potentially have a significant volume of liquid/gas stored inside with a significant amount of potential energy!

The trapped and pressurised fluid/gas could pose a safety hazard during handling, transportation or storage as well as when the tool is dismantled for maintenance.

When the UMT007 displays any of these characteristics it should be considered as potentially containing trapped and pressurised fluid/gas:

- Telemetry failures downhole.
- Signs of mechanical damage.
- Unusual seepage of fluid out of the tool or bubbling/hissing noises.
- Tools that have been fished.
- Tools that have been downhole for extended periods.
- Hard to undo housings or housing split nuts.

When there are signs of trapped pressure, refer to [Section 4.4, Post Logging Checks](#) AND to [Section 5.1, Relief of Trapped Pressure - Tool Disassembly](#).

Note: The above two sections of the manual **MUST** be read in the order shown to avoid unwanted injuries!

2.2.1.1 REMEMBER

- 1 **DO NOT** point parts of the tool (that may become projectiles) at either yourself or others.
- 2 **DO NOT** try to release the pressure by removing filler plugs or other small plug items, unless the instruction manual indicates specifically (refer to [Section 5.1, Relief of Trapped Pressure - Tool Disassembly](#)) that this is the correct method to release the trapped pressure.
- 3 **DO NOT** ignore the risk of trapped pressure and return the tool to its transportation packaging. The tool may explode at any time due to sudden mechanical shock or changes in atmospheric pressure. This could be dangerous dependant on the method of transport of the tool. For example, when the tool is being transported within an aircraft.
- 4 **DO NOT** open the tool either in a confined space or inside a building as there could be a risk of releasing toxic chemicals.
- 5 **DO NOT** install the Thread Protectors to the ends of the tool.

2.2.1.2 Recommended Precautions to Follow

- 1 **Always** wear Personal Protective Equipment (PPE) - hard toe boots, safety glasses and fluid resistant gloves are a minimum.

- 2 **Always** leave the tool to stand in a cordoned-off safe area (preferably outside) marked with hazard signs, for as long as possible (not less than 24hrs). Pressure may leak out slowly and (with sufficient time) the pressure will reduce to a less dangerous and more manageable level.
- 3 **Always** put (in a prominent position) a noticeable warning indicator on the tool (marker pen, sticky label, etc.) to tell others that it is suspected the tool contains trapped pressure. It is advisable also to display (at a safe distance from the tool) large signs that can be read clearly and convey the same warning.
- 4 **Always** make all colleagues and other operators in the area aware that the tool may contain trapped pressure.
- 5 **Always** allow time for the tool to cool down to the ambient (room) temperature. Fluids (especially gases) have more stored potential energy at a high temperature than at the ambient (room) temperature. When the tool is allowed to cool down, it will reduce this potential energy.
- 6 **Always** be aware that the well fluid inside the tool may be hazardous or toxic. For example, it may contain Hydrogen Sulphide (H₂S). Take the appropriate precautions to prevent harm to operators, such as attempting to open the tool outside and the use of toxic-chemical monitoring equipment.
- 7 **Always** be aware that the well fluid inside the tool may be a flammable gas or mist. Open the tool away from sources of ignition or sparking.
- 8 **Always** make sure the suspect tool is disassembled until all volumes inside have been found to be safe and free of pressure.
- 9 Refer to [Section 4.4.1, Relief of Trapped Pressure at the Tool Joints](#) and to [Section 5.1, Relief of Trapped Pressure - Tool Disassembly](#).

2.3 Irritants

Take these precautions when handling, storing or disposing of an irritant:

- Refer **ALWAYS** to the applicable Material Safety Data Sheet (MSDS) for the irritant.
- Do **NOT** touch either your skin or your eyes whilst protective gloves are worn.
- Do **NOT** allow the irritant to either contact the mouth or to be ingested.

Should it be necessary to dispose of an irritant, the disposal **MUST** be in accordance with all Local Rules & Regulations (Directives) that are in force in the country where the disposal is to take place. Should there not be any, then International Rules & Regulations (Directives) **MUST** be obtained and followed.

2.3.1 LIQUID-O-RING® TYPE 101 LUBRICANT



IRRITANT!

LIQUID-O-RING® TYPE 101 LUBRICANT

Contact with the skin or the eyes can cause irritation.

Wear approved protective gloves.

Wear approved protective goggles/glasses.

Wash hands after use.

For more details, refer to the Material Safety Data Sheet (MSDS) for Liquid-O-Ring® type 101.

2.3.2 LOCTITE® 243 THREAD LOCKER



IRRITANT!

LOCTITE® 243 THREAD LOCKER

Wear approved protective gloves.

Wear approved protective goggles.

Wash hands after use.

For more details, refer to the Material Safety Data Sheet (MSDS) for Loctite® 243.

2.4 Tool Integrity

2.4.1 GREASES AND SEALANTS



CAUTION!

Greases and Sealants!

The use of certain greases and sealants that contain a volatile content can cause electrical failure due to the production of corrosive gasses inside the tool when heated.

GE Oil & Gas recommends users to use **ONLY** the greases and sealants as specified for the Tool.

GE Oil & Gas recommends (unless indicated specifically otherwise) the use of Liquid-O-Ring™, type 101 (**P/N: LOR101**) to grease lightly:

- The pressure seals.
- All threads for the tool joints and the pressure housings.
- All seals.

The use of the correct greases and lubricants is essential to the maintenance of all GE Oil & Gas downhole equipment. Because some threads are internal, they will not stop grease entering the tool. Do **NOT** use excessive quantities of any grease. **DO NOT** use copper loaded greases unless specified.

2.4.2 SEAL MAINTENANCE

**CAUTION!****SEAL INTEGRITY!**

Tool function depends upon seal integrity. Replace worn seals.

ALWAYS check **ALL** seals for damage. Remove, discard and replace, when damaged.

2.5 Fluid Ingress

**CAUTION!****Fluid Ingress!**

Unless the Split Nuts/Tool Joints are tightened correctly and fully, the UMT007 may suffer from fluid ingress.

Although the UMT007 is designed to be used in an environment that contains fluids, this is possible only when:

- All Seals are installed correctly.
- All Split Nuts/Tool Joints have been tightened correctly and fully.

Failure to complete any of the above may result in the ingress of fluids that could damage the UMT007. Any fluid that may ingress the tool could become trapped at pressure. This trapped pressure can be dangerous should it not be released in a manner approved for the tool. Refer to the relevant Section in the Manual for the correct procedure to release any trapped pressure. Refer also to [Section 2.2.1, Trapped Pressure Safety Precautions](#).

2.6 Electrostatic Discharge (ESD)

**CAUTION!****Electrostatic Discharge!**

The UMT007 contains electronic circuits and devices that can suffer permanent damage when subjected to an electrostatic discharge.

When servicing the tool, take appropriate precautions to avoid electrostatic discharge damage.

The tool should be handled with care. Whenever the tool is serviced, observe these precautions:

- All work on the electronics within this tool should be carried out at a safe anti-static workstation.
- Wear an ESD wrist strap that is connected to an approved ESD point.
- Where applicable, wear approved electrostatic conducting footwear.
- Avoid touching the tool electronics, unless stated otherwise in this manual.

2.7 WEEE Disposal Information

**CAUTION!****Electrical Equipment Disposal!**

Electrical equipment must be disposed of in accordance with any Local/International Rules and Regulations for the collection framework available to customers for the return, recycling and treatment of electrical wire and components.

For more information refer to: <http://www.weerohsinfo.com/>.

2.8 Transportation and Storage

When the equipment is not installed, commissioned and used in accordance with the GE Oil & Gas specifications, any protection that may have been provided may be impaired.

GE Oil & Gas recommend that the tool is stored and transported always in either the Carry Tube or the Flight Case for protection. The tool should be stored and transported with the threads and the O-Rings greased lightly and the Thread Protectors fitted.

3 THEORY OF OPERATION

3.1 OPERATION OVERVIEW

The Ultrawire™ Memory Tool (UMT007) sends scheduled Ultrawire™ commands to tools and logs their response in a flash memory. Refer to [Figure 3.1](#) for a block diagram overview of the UMT007.

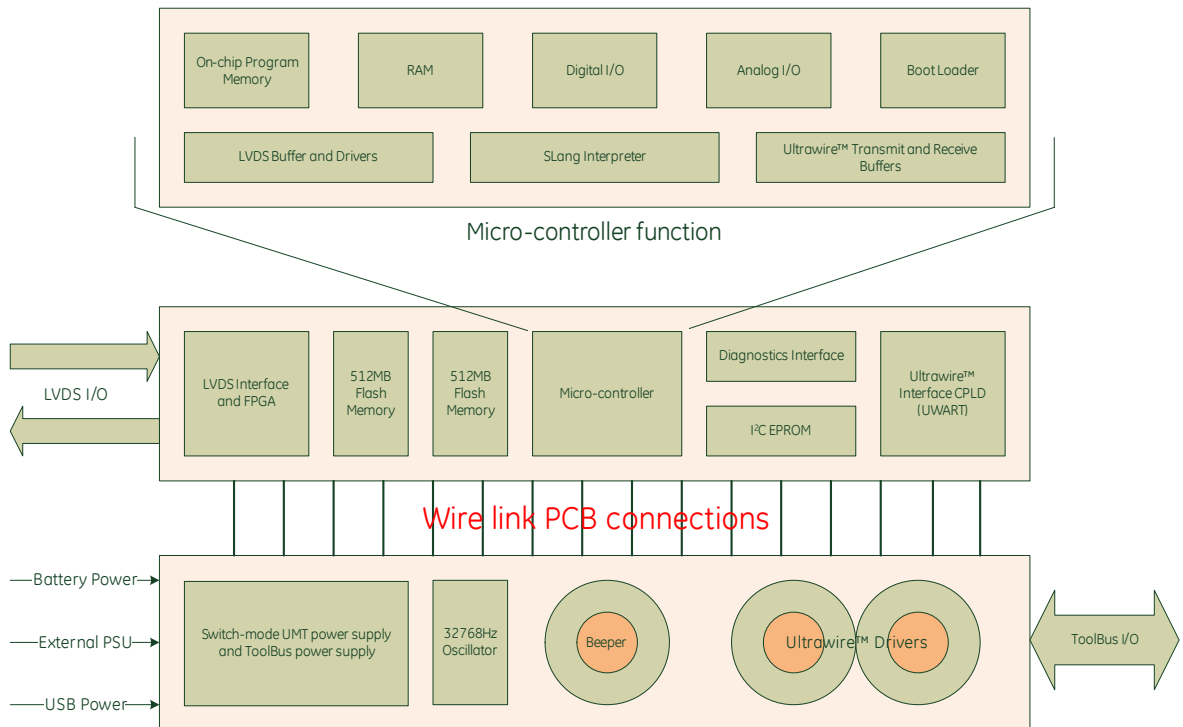


Figure 3.1 UMT007 block diagram

The UMT007 comprises nine main functional blocks that combine microcontroller firmware with electronic hardware:

- Microcontroller.
- Clocks.
- Power Supply.
- SLang Interpreter.
- Ultrawire™ Interface.
- Flash Logging Memory.
- LVDS Communication Interface.
- Sounder.
- Factory Programming Interface.

The Ultrawire™ Memory Tool (UMT007) is an autonomous downhole data-logger. When programmed at the surface with a suitable 'profile' and connected to a power source (normally an 18V Lithium battery pack) (e.g.: MHB030 to MBH033) it will interrogate a connected Ultrawire™ toolstring and record the

resulting data in non-volatile memory for subsequent downloading and analysis. The profile allows (among other things) for:

- Timed low-power sleeping.
- Data logging.
- Opening and closing of tools.
- Loading of tool parameters.

Logging regimes may comprise different rates for different tools as deemed appropriate.

The UMT007 supplies power from the Memory Battery Holder (MBH) (i.e.: MBH030 to MBH033) to the toolstring and monitors the battery voltage and the current along with UMT007 temperature. By default, this data is recorded in the log with other tool data. An over-current trip is implemented to prevent damage in the event of a tool fault.

The surface connection to the UMT007 is a USB connector via the Ultrawire™ Memory Control Unit (UMU001). The USB power alone is sufficient **ONLY** for UMT007 programming and data downloading. An 18VDC external power supply **MUST** be connected via the UMU001 to power a toolstring for tests at the surface. Refer to [Figure 4.1](#) for interconnection information.

Data in memory is protected with an error detection and correction scheme. For additional security, the memory may be used in 'dual redundant' mode where two separate memory devices are used in tandem. The memory capacity is either 1GB in normal mode or 2x 512MB in dual-redundant mode.

3.2 DESCRIPTION

3.2.1 MICROCONTROLLER

The UMT is controlled by a single microcontroller that handles all communication and control functions within the tool.

The UMT007 firmware is embedded in the microcontroller Flash program memory at manufacture and may be (subsequently) either reloaded or upgraded through the use of software on a PC/Laptop/Notebook (refer to the [MN-UWMemlog](#) manual) and the Ultrawire™ Memory Control Unit (refer to the [MN-UMU001](#) manual). The firmware includes also the configuration file for the Ultrawire™ interface CPLD to allow a similarly easy upgrade path.

3.2.2 CLOCKS & WATCHDOGS

The main system clock runs at 8MHz and is operational during data logging. In order to save power, the microcontroller can switch to a 32.768kHz clock and turn off the 8MHz clock. The 32.768kHz clock is running always and is generated by a comparator-based oscillator. Compensation for temperature drift is provided by a firmware algorithm that uses temperature measurements supplied by an on-board precision thermistor.

Should the low-frequency oscillator fail, the system is designed to be fail safe and will continue to run in full-power mode.

3.2.3 POWER SUPPLY

The main power-supply is a switch-mode type that provides a regulated 3V3 rail from a nominal 18VDC supply. A Single-Ended, Primary-Inductor Converter (SEPIC) configuration is used as this will fail safe and a back up linear regulator will take over in this event. During low-power sleep periods, most of the circuitry is switched off to conserve battery charge.

The Toolbus supply includes:

- A programmable and resettable current limit.
- Tool and toolstring current monitors.
- A battery voltage monitor.

3.2.4 SLANG INTERPRETER

Slang (Sondex Logging Language) comprises a list of commands (i.e.: a logging schedule) that is interpreted by the UMT007. Most of these commands generate Ultrawire™ words to operate and log tools over the Ultrawire™ Toolbus. Some of them are concerned with internal UMT007 operations and some with flow control of the logging schedule itself. Slang code is generated from its high-level representation (Graffiti) by software on a PC/Laptop/Notebook and is downloaded to the UMT007 before use.

The Slang interpreter operates from a 20ms timer interrupt and is responsible for the correct sequencing and timing of all UMT007 operations while logging. The Ultrawire™ words are assembled and sent to the Ultrawire™ buffer and the block-header information is sent to the logging memory-buffer. Returned Ultrawire™ words are routed to the logging memory-buffer.

3.2.5 ULTRAWIRE™ INTERFACE

The Ultrawire™ electrical interface comprises a capacitor coupled, choke isolated AMI interface that uses a single conductor (the Ultrawire™ Toolbus) for both power and half-duplex data. The serialization and coding is performed in a Programmable Logic Device (PLD) that presents a parallel interface to the microcontroller.

Ultrawire™ commands are queued when necessary and transmitted at high speed. The received data is checked and queued for logging-memory writing. Data transmission and reception is controlled by an intelligent buffering-algorithm that takes account of timeouts and errors.

3.2.6 FLASH LOGGING MEMORY

Flash logging-memory is supplied as two 512MB plug-in Memory Modules ([P/N: 82189S](#)). The UMT007 can be configured as either 1GB of logging memory or 512MB of dual-redundant memory for enhanced data security.

Received Ultrawire™ data is queued (when necessary) and written to Flash logging-memory along with queued header-data. Firmware checks automatically the integrity of individual Flash-chip pages while logging to make sure there is a high degree of fault tolerance.

The interface between the microcontroller and the Flash logging-memory is implemented in a Field Programmable Gate Array (FPGA) that presents a parallel interface to the microcontroller.

3.2.7 LVDS COMMUNICATIONS INTERFACE

A UMU001 may be connected to the UMT007 through the use of an LVDS (Low Voltage Differential Signalling) bi-directional buffered interface. This allows the software on the PC/Laptop/Notebook to monitor logging operations and to access directly the logging memory.

File transfer routines allow the upload and the download of UMT007 firmware and SLang logging control files to and from the UMT007.

3.2.8 SOUNDER

A piezoelectric sounder is used to signal various conditions using short pips or tunes. SLang (generated from high level Graffiti) inserts automatically a binary sequence of four pips into each scan loop to indicate the loop number starting from '1'. For example, '**Bop-Bop-Bip-Bop**' indicates '0010' binary or loop number '2'.

3.2.9 FACTORY PROGRAMMING INTERFACE

The microcontroller contains a factory programming interface for initial programming. The UMU interface is used for program updates in the field.

4 OPERATING PROCEDURE

4.1 PRE-LOGGING CHECKS

4.1.1 MECHANICAL



IRRITANT! LIQUID-O-RING® TYPE 101 LUBRICANT
 Refer to [Section 2.3.1, Liquid-O-Ring® type 101 Lubricant.](#)

For the Mechanical Pre-Logging Checks, complete these steps:

- 1 Clean and apply Liquid-O-Ring® (*P/N: LOR101*) to the upper O-Ring (*item 13*), the two lower O-Rings (*item 11*) and the two lower Backup Rings (*item 7*). Replace the O-Rings when damaged.
- 2 Make sure the upper and the lower electrical connectors are clean, dry and undamaged.

4.1.2 ELECTRICAL

For the Electrical Pre-Logging Checks, complete these steps:

- 1 Use a multimeter to measure the pin to housing resistance of the MonoConn Female Connector and make sure the reading is 3MΩ to 4MΩ.
- 2 Use a multimeter to measure the pin to housing resistance for each pin of the 7-Way Connector and for the Canted Contact Spring. Make sure the readings are as given in [Table 4.1](#).

Table 4.1 7-Way Connector resistance measurements

Pin No./Contact	Signal	Expected Resistance
1	Vext	Greater than 50kΩ
2	0V	Less than 1Ω
3	Rx-	Greater than 50kΩ
4	Rx+	Greater than 50kΩ
5	Tx-	Greater than 50kΩ
6	Tx+	Greater than 50kΩ
7	Ext5V	Greater than 50kΩ
Canted Contact Spring	Vbat	Greater than 50kΩ

4.1.3 PROGRAMMING

For the Programming Pre-Logging Checks, complete these steps:

- 1 Program the UMT007 with a job profile.

The Ultrawire™ Memlog software can be used to create the job profile and does not require the UMT007 to be connected during this process. Refer to [MN-UWMemlog](#).

- 2 When the job profile has been created, remove the upper Thread Protector ([item 5](#)) and connect the UMT007 as shown in [Figure 4.1](#).

Refer to [Appendix A, Equipment & Recommended Spares](#) for equipment details.

Note: Normally, the UMU001 obtains its power supply (for data transfer and programming) via the USB lead from the PC/Laptop/Notebook. It is essential to connect an 18VDC power supply to the UMU when it is required to run a toolstring. For more details, refer to the UMU001 manual ([MN-UMU001](#)).

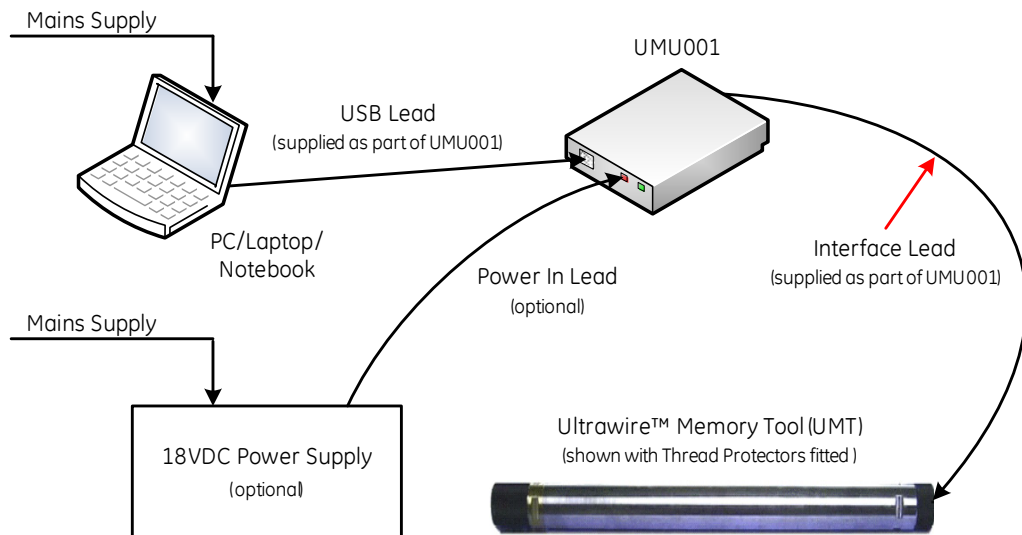


Figure 4.1 Programming connection diagram

- 3 Program the UMT007 as detailed in the Ultrawire™ Memlog manual ([MN-UWMemlog](#)).
- 4 Remove the power and disconnect.
- 5 Make sure the upper Thread Protector ([item 5](#)) and the lower Thread Protector ([item 4](#)) are fitted until the toolstring is ready for logging.

4.2 CONNECTION TO TOOLSTRING

The upper and the lower tool joint O-Rings and the seal surfaces should be clean, undamaged and greased lightly.

Make sure the voltage rating of the tools match, but do not exceed, the tool rating of the Adapters.

The UMT007 should be located below the Memory Battery Holder (MBH) at the top of the toolstring and above the Ultrawire™ tools.

The UMT007 includes a sounder that indicates the operating mode (refer to [Appendix D, UMT Sound Library](#)). The various sounds emitted and their timing depend on the stored logging profile. Refer to the Ultrawire™ Memlog manual ([MN-UWMemlog](#)) for further details.

4.3 LOGGING

Table 4.2 is for guidelines only and must be used in conjunction with local policy and specific well site conditions both downhole and at the surface. The information is appropriate for near vertical wells and must be adjusted accordingly when in deviated wells. The use of a Head Tension Unit is highly recommended.

Note: Do not exceed the calculated safe working load of your selected weak point. When in doubt, use a Head Tension Unit, especially in deviated wells where calculation from surface tension is less accurate.

Table 4.2 Logging specification

Depth (ft)	Speed Pulling Out of Hole	Speed Running in Hole
In/out of catcher (pressure rig up only)	Dead slow or manual	
30 to 150	30ft/min	
150 to 400	60ft/min	
>400 clear cased hole	Surface tension is not to exceed 120% of tension when the tool is stationary. Speed not to exceed 150ft/min.	Surface tension should not be less than 80% of tension when the tool is stationary. Speed not to exceed 150ft/min.
>400 clear open hole	Surface tension is not to exceed 130% of tension when the tool is stationary. Speed not to exceed 150ft/min.	Surface tension should not be less than 70% of tension when the tool is stationary. Speed not to exceed 150ft/min.
Approaching potential obstacles ^a	30ft/min	
Logging Data	Do not exceed the above speeds Recommended speed is <30ft/min.	

a. For example: Reduced diameters, gas lift mandrels, fluid levels, valves, tubing shoes, packers, cross overs and other downhole equipment.

4.4 POST LOGGING CHECKS



WARNING!

TRAPPED PRESSURE!

Refer to [Section 2.2.1, Trapped Pressure Safety Precautions](#).

When any of the circumstances that follow are encountered or it is suspected that the tools may have leaked, then you must proceed as if the tools contain trapped, pressurised fluid/gas until otherwise determined. The characteristics of trapped pressure are:

- Telemetry failures downhole.
- Signs of mechanical damage.
- Unusual seepage of fluid out of the tool or bubbling/hissing noises.
- Tools that have been fished.
- Tools that have been downhole for extended periods.
- Hard to undo housings or housing split-nuts.

4.4.1 RELIEF OF TRAPPED PRESSURE AT THE TOOL JOINTS

To relieve the trapped pressure at the tool joint, complete these steps:

- 1 Place a rag over the tool joint. This will diffuse any jet of gas or fluid that may emerge from the tool joint.
- 2 Unscrew **SLOWLY** the tool joint. Should there be trapped pressure inside the tool joint, the tool joint may well be tighter than usual and require more torque than normal to undo.
- 3 At some point, well before the threads of the tool joint disengage, fluid or gas release will occur. As soon as any hissing or fluid appearance is noted, cease **IMMEDIATELY** to unscrew the tool joint and allow the pressure to dissipate before unscrewing further. This way, the pressure load on the tool joint can be retained safely by the threads that remain engaged.
- 4 Once the operator is satisfied that no more fluid or gas is escaping, resume to unscrew **SLOWLY** the tool joint. When further hissing or signs of fluid escape are evident, cease **IMMEDIATELY** the unscrewing and allow the pressure to dissipate.
- 5 Repeat these steps until all trapped pressure within the tool joint is released and there is no pressure loading.
- 6 The above procedure **DOES NOT** relieve any pressure that may be trapped within the UMT007. To relieve any pressure trapped within the UMT007, refer to [Section 5.1, Relief of Trapped Pressure - Tool Disassembly](#) **BEFORE** proceeding with either Post Logging Disassembly or Transportation.
- 7 For other tools, refer to the relevant Section of their Operation & Maintenance Manual.

4.5 TRANSPORT, HANDLING & STORAGE

**WARNING!**

LIQUID-O-RING® TYPE 101 LUBRICANT

Refer to [Section 2.3.1, Liquid-O-Ring® type 101 Lubricant](#).

Store with end threads lightly greased with Liquid-O-Ring® (P/N: LOR101) and with water tight thread protectors fitted.

The tool should be transported to site in the transport case provided.

Do not subject the tool to extreme shock, such as dropping or hitting with a hard object.

5 MECHANICAL DESCRIPTION

The Ultrawire™ Memory Tool (UMT007) comprises two circuit boards contained in a pressure housing. The top tool joint is designed to connect to either a logging battery pack (i.e.: MBH030 to MBH033) or a UMU001 lead. The lower tool joint is a standard Sondex mono conductor.

The principal elements are:

- Pressure Housing.
- Processor Circuit Board.
- PSU/UW Interface Circuit Board.
- Upper End fitted with 7-Way Connector.
- Lower End fitted with mono conductor socket.

5.1 Relief of Trapped Pressure - Tool Disassembly

**WARNING!****TRAPPED PRESSURE!**

Refer to [Section 2.2, Stored Energy](#).

Ref.: UMT007 General Assembly

[AD-09817](#)

Note: Where tools are fitted either above or below the UMT007, refer to [Section 4.4.1, Relief of Trapped Pressure at the Tool Joints](#) for instructions on how to remove safely these tools before you proceed.

To relieve the trapped pressure, complete these actions:

- 1 Place a rag over the upper end of the Lower Sub ([item 3](#)) and the joint between the Lower Sub and the Pressure Housing ([item 2](#)) of the UMT007. This will diffuse any jet of gas or fluid/gas that may emerge from the joint and the upper end of the Lower Sub.
- 2 Unscrew **SLOWLY** the Pressure Housing from the Lower Sub of the UMT007. Should there be trapped pressure inside the Pressure Housing, the tool joint may well be tighter than usual and require more torque than normal to undo.
- 3 At some point, well before the threads of the joint have become disengaged, fluid or gas release will occur. As soon as any hissing or fluid appearance is noted, the disconnection process should cease **IMMEDIATELY** and the pressure inside the Pressure Housing allowed to escape before the joint is unscrewed further. This way, the pressure load on the tool joint can be retained safely by the threads that remain engaged.
- 4 Once the operator is satisfied that no more fluid or gas is escaping, resume to unscrew **SLOWLY** the joint. When further hissing or signs of fluid escape are evident, cease **IMMEDIATELY** the unscrewing and allow the pressure to dissipate.
- 5 Repeat these steps until all trapped pressure is released and there is no pressure loading on the tool joint.

5.2 Pressure Housing

Ref.: UMT007 General Assembly

[AD-09817](#)

5.2.1 REMOVAL



IRRITANT!

LIQUID-O-RING™ LUBRICANT

Refer to [Section 2.3, Irritants](#).

To remove the Pressure Housing, complete these steps:

- 1 Make sure the UMT007 is clean and supported in wood 'V'-blocks on a workbench.
- 2 Remove and retain the upper Thread Protector ([item 5](#)) from the Pressure Housing ([item 2](#)).
- 3 Use two suitable size spanners (wrenches) to release the Pressure Housing from the Lower Sub ([item 3](#)).
- 4 Remove carefully and retain the Pressure Housing from over the Electronics Assembly ([item 1](#)).
- 5 Check the O-Ring ([item 13](#)) and replace when either worn or damaged.
- 6 Check the two O-Rings ([item 12](#)) and the two Backup Rings ([item 6](#)) and replace when they are either worn or damaged. Refer to [Appendix C, Fitting of Anti-Extrusion Rings](#) for the correct installation of the two Backup Rings.

Note: Refer to [Section 7.1.3, Seal Replacement Recommendations](#) for the GE Oil & Gas recommended O-Ring replacement schedule.

5.2.2 INSTALLATION



IRRITANT!

LIQUID-O-RING™ LUBRICANT

Refer to [Section 2.3, Irritants](#).

To install the Pressure Housing, complete these steps:

- 1 Make sure all components are clean, dry and free of corrosion.
- 2 Apply a thin film of Liquid-O-ring™ ([P/N: LOR101](#)) to the O-Ring ([item 13](#)) and the groove in the upper end of the Electronics Assembly ([item 1](#)).
- 3 Apply a thin film of Liquid-O-Ring™ to the two O-Rings ([item 12](#)) and the two Backing Rings ([item 6](#)) that are installed on the upper end of the Lower Sub ([item 3](#)).
- 4 Install carefully the Pressure Housing ([item 2](#)) over the Electronics Assembly until it touches the threads of the Lower Sub.
- 5 Hand-tighten the Pressure Housing onto the threads of the Lower Sub.
- 6 Use two suitable size spanners (wrenches) to tighten the Pressure Housing onto the Lower Sub.

- 7 Apply a thin film of Liquid-O-Ring™ to the O-Ring ([item 13](#)) and the groove in the upper Thread Protector ([item 5](#)).
- 8 Install the upper Thread Protector in the upper end of the Pressure Housing.

5.3 Lower Sub

Ref.: UMT007 General Assembly

[AD-09817](#)

5.3.1 REMOVAL AND DISASSEMBLY



IRRITANT!

LIQUID-O-RING™ LUBRICANT

Refer to [Section 2.3, Irritants](#).

To remove the Electronics Assembly, complete these steps:

- 1 Remove and retain the Pressure Housing ([item 2](#)).
Refer to [Section 5.2.1, Removal](#).
- 2 Remove and retain the lower Thread Protector ([item 4](#)) from the lower end of the Lower Sub ([item 3](#)).
- 3 Remove and retain the Internal Retaining Ring ([item 10](#)) from the lower end of the Lower Sub.
- 4 Pull carefully the MonoConn Female Connector ([item 8](#)) from the lower end of the Lower Sub.
It should be remembered there is a wire connected to the rear of the MonoConn Female Connector.
- 5 Remove carefully and discard the heatshrink sleeve from the MonoConn Female Connector.
- 6 Use a suitable soldering iron to disconnect the wire from the MonoConn Female Connector and then retain the MonoConn Female Connector.
- 7 Screw in (clockwise) the three Skt Hd Grub Screws ([item 14](#)) to release the Electronics Assembly ([item 1](#)) from the Lower Sub.
Do not over tighten the three Skt Hd Grub Screws. Screw them in just enough to enable removal of the Lower Sub.
- 8 Remove carefully and retain the Electronics Assembly from the Lower Sub.
Make sure the wire that was attached to the MonoConn Female Connector is not damaged.
- 9 Remove and retain the Wire Spring ([item 9](#)) from the Lower Sub.
Sometimes the Wire Spring is removed when the Electronics Assembly is removed.

5.3.2 ASSEMBLY AND INSTALLATION

**IRRITANT!****LIQUID-O-RING™ LUBRICANT**Refer to [Section 2.3, Irritants](#).

To install the Electronics Assembly, complete these steps:

- 1 Make sure all components are clean, dry and free of corrosion.
- 2 Put the wire from the Electronics Assembly ([item 1](#)) through the Wire Spring ([item 9](#)).
- 3 Put the wire through the Lower Sub ([item 3](#)) from the upper end to the lower end.
- 4 Insert the Electronics Assembly in the upper end of the Lower Sub.

Make sure the three holes in the Lower Sub align with the three Skt Hd Grub Screws ([item 14](#)) that are in the Electronics Assembly.
- 5 Push the Electronics Assembly into the upper end of the Lower Sub against the Wire Spring and then hold in position.
- 6 Screw out (anti/counter-clockwise) in small amounts and in turn the three Skt Hd Grub Screws until the Electronics Assembly is held securely in the upper end of the Lower Sub.
- 7 Make sure the O-Ring ([P/N: 99012](#)) on the MonoConn Female Connector ([item 8](#)) is serviceable. When it is not, remove and discard the O-Ring and install a new O-Ring with the use of Liquid-O-Ring® ([P/N: LOR101](#)).
- 8 Apply a short length (15mm approx.) of Ø2.4mm Kynar Heatshrink Sleeve over the wire from the Electronics Assembly.
- 9 Use a suitable soldering iron and SN100C solder to connect the wire to the central connector of the MonoConn Female Connector.

Clean the joint after soldering to remove any flux residue.
- 10 Position the Heatshrink Sleeve over the solder connection and use a suitable heat gun to shrink the Heatshrink Sleeve in position.
- 11 Locate the MonoConn Female Connector in the lower end of the Lower Sub.

Pull gently the line wire through from the Electronics Assembly as the connector is inserted to make sure the wire does not get trapped or damaged.
- 12 Install the Internal Retaining Ring ([item 10](#)) in the lower end of the Lower Sub to secure in position the MonoConn Female Connector.
- 13 Install the lower Thread Protector ([item 4](#)) on the lower end of the Lower Sub.
- 14 Install the Pressure Housing ([item 2](#)).

Refer to [Section 5.2.2, Installation](#).

5.4 Electronics Assembly

5.4.1 DISASSEMBLY

Ref.: Electronics Assembly
Wiring Diagram

[AD-43014](#)
[WD-82196](#)

Note: Item numbers refer to the UMT007 Electronics Assembly (AD-43014), unless stated otherwise.



IRRITANT!

LIQUID-O-RING™ LUBRICANT

Refer to [Section 2.3, Irritants](#).

Note: **DO NOT** attempt to separate the two halves (Part A and Part B) of the Processor Board Assembly ([item 8](#)) as they **CANNOT** be serviced. Disconnect **ALL** wire connections to permit the replacement of the complete Processor Board Assembly.

To disassemble the Electronics Assembly, complete these steps:

- 1 Remove and retain the Pressure Housing.

Refer to [Section 5.3.1, Removal and Disassembly](#).
- 2 Remove the four Csk Hd Slotted Screws ([item 20](#)) that secure the Electronics Chassis ([item 2](#)) to the Hex Pillars ([item 14](#)).
- 3 To remove one of the two Electronics Chassis, remove the four Csk Hd Slotted Screws ([item 19](#)).

Two Csk Hd Slotted Screws are from the Upper Bulkhead ([item 3](#)) and two Csk Hd Slotted Screws are from the Lower Bulkhead ([item 1](#)).
- 4 To remove carefully the second Electronic Chassis, remove the remaining four Csk Hd Slotted Screws ([item 19](#)).

Two Csk Hd Slotted Screws are from the Upper Bulkhead and two Csk Hd Slotted Screws are from the Lower Bulkhead. The chassis will fall apart when this is done so take care not to damage the two Processor Board Assemblies.
- 5 The Processor Board Assembly ([item 8](#)) is retained by the four PCB Mountings ([item 9](#)) in recesses in the Upper Bulkhead and the Lower Bulkhead.

Where the two Bulkheads do not separate from the two Processor Board Assemblies by themselves, pull gently the two Bulkheads away from the two Processor Board Assemblies.
- 6 To separate the two halves of the Processor Board Assembly, remove two of the Hex Pillars ([item 14](#)) from the same side of one of the Processor Board Assemblies and then fold out gently the two Processor Board Assemblies.
- 7 Where it is required that the Processor Board Assemblies are to be replaced, all the wires to the Processor Board Assembly should be unsoldered now.

With reference to the Wiring Diagram ([WD-82196](#)), make a note of where and how the wires are connected to the Processor Board Assembly ([item 8](#)).

- 8 Remove carefully the wires through the strain relief holes in the Processor Board Assembly. Refer to the Wiring Diagram ([WD-82196](#)) for connection details of the wires.

Note: The wires pass through the strain relief holes in the Processor Board Assembly **BEFORE** they are soldered to the Processor Board Assembly.

- 9 When the 7-Way Connector ([item 15](#)) is to be replaced/serviced, make sure all the wires from the Processor Board Assembly are disconnected.

Note: Unless the wires to the 7-Way Connector ([item 15](#)) are disconnected first, they will become damaged when the 7-Way Connector is removed.

5.4.2 REMOVAL OF THE 7-WAY CONNECTOR

Ref.: Electronics Assembly [AD-43014](#)
Wiring Diagram [WD-82196](#)

Note: Item numbers refer to the UMT007 Electronics Assembly (AD-43014), unless stated otherwise.

To remove the 7-Way Connector, complete these steps:

- 1 Make sure all the wires have been disconnected from the Processor Board Assembly ([item 8](#)).
- 2 Push down gently on the Grounding Washer ([item 7](#)) to relieve the pressure on the External Retaining Ring ([item 11](#)) and then remove carefully and retain the External Retaining Ring ([item 14](#)) from the Upper Bulkhead ([item 3](#)).

When the External Retaining Ring is removed the Spring ([item 10](#)) will expand.

- 3 Remove and retain the Grounding Washer and the Spring from the Upper Bulkhead.
- 4 Use a suitable size spanner (wrench) to release and remove carefully the 7-Way Connector ([item 15](#)).

The 7-Way Connector is screwed into the Insulator Base and has wires attached. Make sure the wires do not get damaged as the connector is unscrewed and the wires are pulled out through the Upper Bulkhead.

- 5 Remove and retain the Skt Hd Grub Screw ([item 21](#)) from the Insulator Base ([item 4](#)).
- 6 Make sure these components are removed and retained once the 7-Way Connector has been removed:
 - Insulator Cap - [item 6](#).
 - Upper Contact - [item 5](#) (complete with the Canted Contact Spring - [item 12](#)).
A wire is attached to the Upper Contact. Make sure the wire is not damaged as it is pulled out through the Upper Bulkhead.
 - Insulator Base - [item 4](#).
 - 2x Spirol Pin - [item 17](#).
Do not attempt to remove these from the Insulator Base, but retain any that are loose.
- 7 When necessary, remove and discard the Canted Contact Spring ([item 12](#)) from the Upper Contact ([item 5](#)).

- 8 Where the 7-Way Connector is to be replaced, complete these steps:

Refer to [Figure 5.1](#) and [Figure 5.2](#) for these steps.

- A Remove and discard the Silicon Sleeve from the wires.
- B Remove carefully the Heatshrink Sleeve from each wire attached to the 7-Way Connector.
- C Use a suitable soldering iron to disconnect the seven wires from the 7-Way Connector.

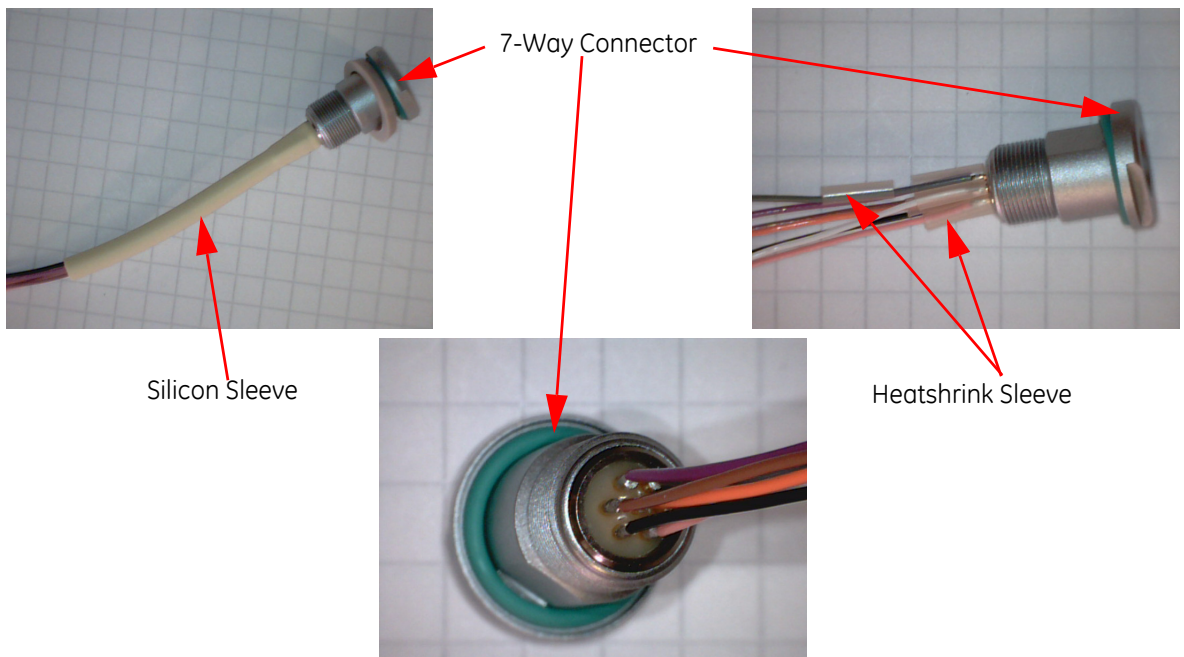


Figure 5.1 Connection of the wires to the 7-Way Connector

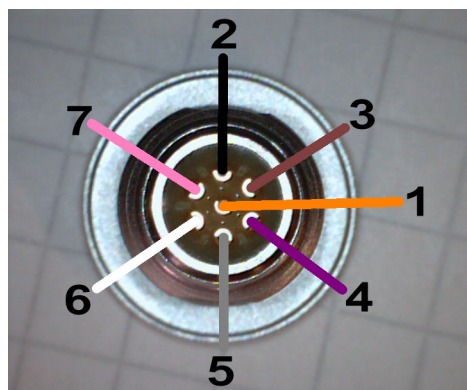


Figure 5.2 Identification of wires connected to the 7-Way Connector

5.4.3 ASSEMBLY

**CAUTION!****ELECTROSTATIC DISCHARGE!**Refer to [Section 2.6, Electrostatic Discharge \(ESD\)](#).

To assemble the Electronics Assembly, complete these steps:

- 1 Make sure all components are clean, dry and free of corrosion.
- 2 Make sure there is a wire connected to the two Solder Tags ([item 16](#)).

Where it is not, complete these steps:

- A Put a short length (15mm approx.) of Ø2.4mm Kynar Heatshrink Sleeve over the wire.
 - B Use a suitable soldering iron and SN100C solder to connect the wire to the Solder Tag. Clean the joint after soldering to remove any flux residue.
 - C Slide the Heatshrink Sleeve over the Solder Tag.
 - D Use a suitable heat gun to shrink the Heatshrink Sleeve.
- 3 Where a new 7-Way Connector ([item 15](#)) is to be installed, complete these steps:

Refer to [Figure 5.2](#) and [Figure 5.1](#) for the these steps.

- A Refer to the Wiring Diagram ([WD-82196](#)) to identify which wire is to be attached to which connector on the 7-Way Connector.
 - B Put a small length (15mm approx.) of Ø1.6mm Kynar Heatshrink Sleeve over the end of each wire that is to be attached to the 7-Way Connector.
 - C Use a suitable size soldering iron and SN100C solder to connect the wires to the correct solder bucket of the 7-Way Connector and then clean the solder joints to remove any flux residue after soldering.
 - D As each wire is connected to the 7-Way Connector, push the Heatshrink Sleeve over the connection and then use a suitable heat gun to shrink the Heatshrink Sleeves onto the individual wires.
 - E Put a short length (40mm approx.) of Ø3mm Silicon Sleeve over all the wires connected to the 7-Way Connector.
 - F Push the Silicon Sleeve over the wires and against the 7-Way Connector.
- 4 Make sure the wire is attached correctly to the Upper Contact ([item 5](#)).
 - 5 Put these components (in the order given) over the wires from the 7-Way Connector and push them against the 7-Way Connector:
 - Insulator Cap ([item 6](#)).
 - Upper Contact ([item 5](#)) complete with the Canted Contact Spring ([item 12](#)).
 - 6 Make sure the two Spirol Pins ([item 17](#)) are inserted correctly in the Insulator Base ([item 4](#)).

- 7 Push the wire from the Upper Contact through the hole in the Insulator Base and then the hole in the Upper Bulkhead ([item 3](#)).

Make sure the Insulator Base and the Upper Bulkhead are oriented correctly. Refer to [Figure 5.3](#).

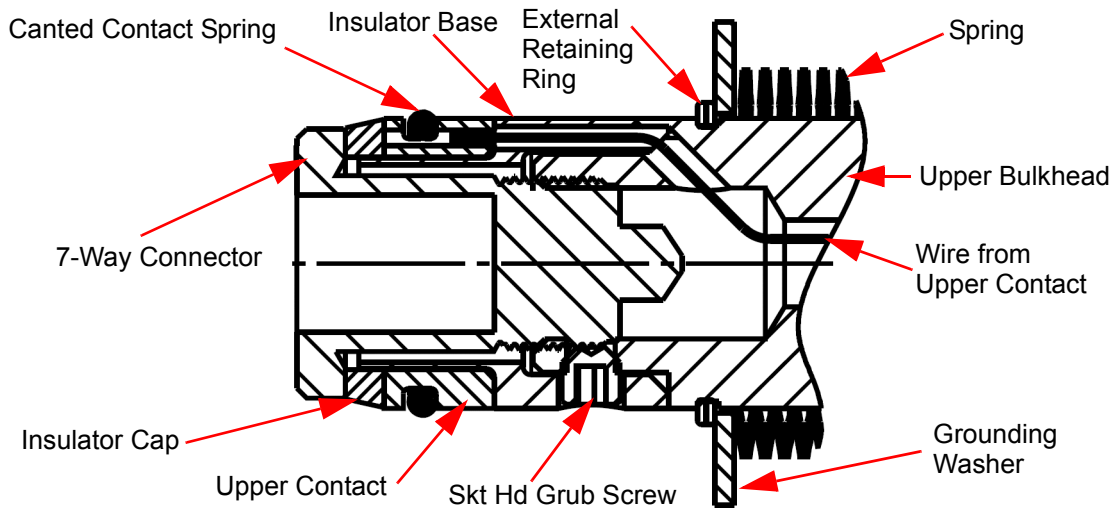


Figure 5.3 Routing of wire from Upper contact

- 8 Push the other wires (from the 7-Way Connector) through the centre of the Insulator Base and the Upper Bulkhead.

- 9 Push these components over the Upper Bulkhead as the 7-Way Connector is inserted into the Upper Bulkhead:

- Upper Contact complete with the Canted Contact Spring.
- Insulator Cap.

- 10 Make sure the Spirol Pins in the Insulator Base locate correctly in the holes in the Upper Contact.

The correct location of the Spirol Pins will make sure the hole in the Insulator base and the hole in the Upper Bulkhead remain aligned for the wire from the Upper Contact.

- 11 Hand-tighten the 7-Way Connector in the Upper Bulkhead and at the same time pull gently on all wires that are pushed through the Upper Bulkhead.

Make sure the wires do not become damaged as the components are tightened together.

- 12 When the 7-Way Connector has been hand-tightened fully, use a suitable size spanner (wrench) to tighten fully the 7-Way Connector.

- 13 Locate the Spring ([item 10](#)) and then the Grounding Washer ([item 7](#)) on the Upper Bulkhead.

- 14 Push gently on the Grounding Washer to compress the Spring and then install the External Retaining Ring ([item 11](#)) in the groove in the Upper Bulkhead.

- 15 Make sure a Solder Tag ([item 16](#)) is attached to the Upper Bulkhead ([item 3](#)) and to the Lower Bulkhead ([item 1](#)).

When a Solder Tag has to be attached to a Bulkhead (Upper or Lower), complete these steps:

- A Insert the Pan Hd Slotted Screw ([item 18](#)) through the Serrated Lock Washer ([item 22](#)) and the Solder Tag ([item 16](#)).
- B Insert the Pan Hd Slotted Screw into one of the threaded holes in the Bulkhead (Upper or Lower) and tighten.

Where possible, make sure the lug of the Solder Tag is furthest from the centre of the Electronics Assembly.

- 16 Where a new Processor Board Assembly ([item 8](#)) is to be installed, complete these steps:
- A Use a suitable solder iron and SN100C solder to connect all the wires to the Processor Board Assembly Clean the solder joints after soldering to remove any flux residue.
- B Insert a Hex Pillar ([item 14](#)) through a Plain Washer ([item 23](#)), a Crinkle Washer ([item 24](#)) and one of the holes (FX1 to FX4) in the Processor Board Assembly. Refer to [Figure 5.4](#) for identification of the holes for the Hex Pillars.
- C Attach a Hex Spacer ([item 13](#)) to the Hex Pillar and tighten.
- D Repeat [Step B](#) and [Step C](#) for the other three Hex Pillars, three Plain Washers and three Crinkle Washers.

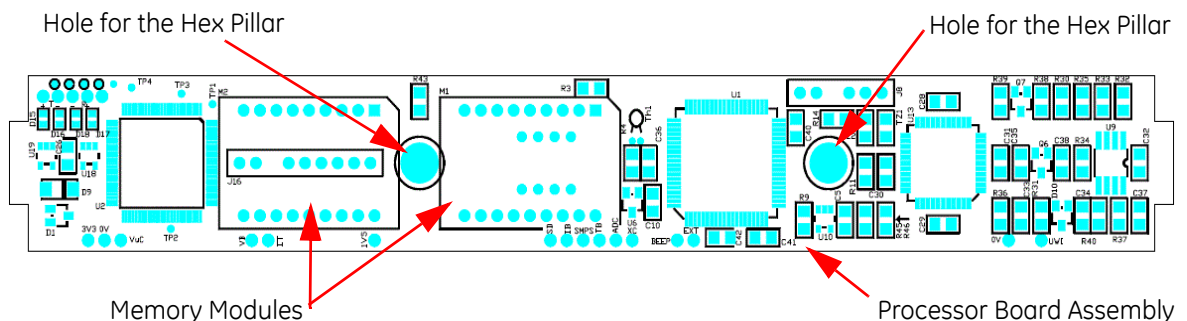


Figure 5.4 Identification of holes for the Hex Pillars

- 17 Install the four PCB Mountings ([item 9](#)) on the ends of the two Processor Board Assemblies.
- 18 Locate the ends of the Processor Board Assembly (complete with the PCB Mountings) in the slots in the Lower Bulkhead ([item 1](#)).
- 19 Locate one of the Electronics Chassis ([item 2](#)) over one half of the Processor Board Assembly and against the Lower Bulkhead.
- 20 Insert finger-tight, two Csk Hd Slotted Screws ([item 19](#)) to secure the Electronics Chassis to the Lower Bulkhead.
- 21 Repeat [Step 19](#) and [Step 20](#) for the second Electronics Chassis.
- 22 Locate the upper ends of the Processor Board Assembly (complete with the PCB mountings) in the slots in the Upper Bulkhead ([item 3](#)).

- 23 Insert finger-tight, two Csk Hd Slotted Screws ([item 19](#)) to secure one of the Electronics Chassis to the Upper Bulkhead.
- 24 Insert finger-tight, the other two Csk Hd Slotted Screws ([item 19](#)) to secure the other Electronics Chassis to the Upper Bulkhead.
- 25 Make sure the two Processor Board Assemblies are located correctly in the Bulkhead slots and then tighten the eight Csk Hd Slotted Screws.
- 26 Insert finger-tight, the four Csk Hd Slotted Screws ([item 20](#)) through the two halves of the Electronics Chassis and into the four Hex Pillars.
- 27 Make sure the alignment of the two Electronics Chassis and the two Processor Board Assemblies is correct and tighten the four Csk Hd Slotted Screws ([item 20](#)).
- 28 Install the Pressure Housing.

Refer to [Section 5.3.2, Assembly and Installation](#).

6 ELECTRICAL DESCRIPTION

6.1 OVERVIEW

Ref.: UMT008 Circuit Diagram

[CD-82196](#)

The Ultrawire™ Memory Tool (UMT007) has memory chips with a high capacity and an improved power supply. The UMT007 has a simplified board interconnection method and a more robust battery power input connector than Type 1 UMT tools. The Electronics Assembly ([item 1, 09817](#)) is common between the UMT007 and the UMT008.

There are three programmable devices U1, U2 and U13. The firmware for the U1 contains also the firmware image for the U2. The U2 is programmed by the microcontroller U1.

Note: In the sections that follow, all text that is in **Bold** and *Italic* (e.g.: **Beep**) denotes either a microcontroller I/O pin or another named signal.

6.2 POWER UP

The UMT007 can use three different power sources, each of which will affect its mode of operation. The power source is identified at boot-up by a combination of measured voltage and the **ExtOn** microcontroller signal which is 'Hi' when **Vext** (which connects to the 7-Way Connector - [item 15, 43014](#)) is used as the power source.

6.2.1 BATTERY POWER

This is supplied via the canted coil spring connector and would normally connect to a Memory Battery Holder (e.g.: MBH030 to MBH033). When power is applied here, the UMT007 will either start or re-start any loaded profile without user intervention.

6.2.2 EXTERNAL 18VDC

This is supplied to the 7-Way Connector ([item 15, 43014](#)) via the Ultrawire™ Memory Control Unit (UMU001), usually from an 18VDC mains adaptor but optionally from a Memory Battery Holder (MBH) with an adaptor cable. The UMT007 will boot up with the Toolbus off and await commands from the Ultrawire™ Memlog software. This allows the Ultrawire™ Memlog software to take control of logging for surface test purposes as well as data download and UMT007 programming.

6.2.3 USB POWER

This is supplied to the 7-Way Connector ([item 15, 43014](#)) via the Ultrawire™ Memory Control Unit (UMU001). The 5VDC USB supply is dropped to 4.1VDC by a linear regulator inside the UMU and then to 3.4VDC (approx.) by diodes in the UMT007. This supply is adequate for programming but will **NOT** provide power to the Ultrawire™ Toolbus for a toolstring check. In addition, the sounder will **not** work.

6.3 RESET

After a reset, the microcontroller I/O pins become high impedance inputs to await configuration. Several of these pins are used to control the peripherals and have either pull-ups or pull-downs to assert their status after a reset.

6.4 UMT007 POWER SUPPLY

A 2.5VDC reference voltage is provided by U11.

The Switched-Mode Power Supply (SMPS) is always on. This is a boost/buck or Single-Ended, Primary-Inductor Converter (SEPIC) configuration. When the USB 5VDC power is used, the SMPS is still on, but, dependant on the actual USB voltage level, is largely idling.

Transistor Q4 and the associated components provide a back-up linear power supply in the event of SMPS failure. The output from this sits at about 3.0VDC, just below the SMPS 3.3VDC and thus supplies no power when the 3.3VDC supply is working. Should the linear supply be activated, the **SMPSfail** microcontroller input is taken 'Hi'.

The 3.3VDC supply feeds also a linear regulator made up from Q8, U12 and U16. This regulator provides a 1.5VDC supply for the FPGA U2.

When using either an external 18VDC or battery power, the UMT007 current (excluding the Toolbus current) is monitored on **ITmon**.

6.5 TOOLSTRING POWER SUPPLY

The power supply is capable of passing up to 2A to the toolstring and is activated by **TBctrl**. Total supply current (including the Toolbus) is measured on **IBmon** and firmware controls the over-current trip.

The supply voltage is monitored on **VBmon**.

6.6 LF OSCILLATOR OPERATION

The LF Oscillator is implemented through the use of a comparator-based oscillator across the temperature range. Signal **XCin** is a full-level square wave. Compensation for temperature drift of the 32.768Hz crystal is provided in firmware. This oscillator is used to run the processor in sleep mode to save power.

6.7 SLEEP MODE

When in its power-saving sleep mode, the 3.3VDC rail is turned off by **ShutDown** via Q5. The LF oscillator and the microcontroller are supplied from **VuC**. This means that the 16MHz clock oscillator is turned off along with most other circuitry. In addition, firmware sets the status of the various I/O pins for minimum power consumption. The firmware then runs a timer algorithm at low speed until it is time to wake up.

6.8 UMT TEMPERATURE

A precision thermistor (Th1) is used to measure the tool temperature in conjunction with a look-up table embedded in firmware.

6.9 INTERFACES

6.9.1 EEPROM INTERFACE

A 256-byte I²C serial EEPROM is connected to microcontroller ports '7:0' and '7:1' that are 'bit-banged' in firmware to provide a sufficient subset of the I²C protocol for EEPROM read and write. This is used to store power-fail-restart information and a tool-temperature histogram.

6.9.2 LVDS AND MEMORY INTERFACE

The Low Voltage Differential Signalling (LVDS) interface logic is contained in U2, a Field Programmable Gate Array (FPGA). This provides:

- A 12MBaud asynchronous serial data transmitter.
- Logic to access the memory chips directly.
- A gateway for 500kBaud transmit and receive UARTs on the microcontroller.
- A complex mathematical error detection and error correction mechanism for the log data as it is written to the flash memory.

Memory control signals are routed mostly through this device to provide extra memory selection logic and clock signals to enhance speed.

The LVDS signals provided by U18 and U19 are connected to the 7-Way Connector ([item 15, 43014](#)). The UMU001 converts these signals to logic levels and interfaces them to a USB2 chip that connects to a PC/Laptop/Notebook.

6.10 BEEPER

The piezoelectric sounder is controlled by **Beep** that is driven from an oscillator ('Timer 4') under firmware control. The sounder is driven by a bridge amplifier that is designed so the outputs will both settle at 0V after sounding so a sounder short will not waste power. The connector J9 may be used as a mute connection for testing. A short circuit here will mute the sounder. The installation of a 100 ohm resistor will make it very quiet but still audible.

7 EXTENDED CHECKS

7.1 Preventative Maintenance

**IRRITANT!**

LIQUID-O-RING® TYPE 101 LUBRICANT

Refer to Section 2.8.1, Liquid-O-Ring® type 101 Lubricant.

**CAUTION!**

SEAL INTEGRITY!

Refer to Section 2.9, Tool Integrity.

This section provides guidance to aid in the creation of a Tool Maintenance Schedule to help keep the tool operational and potentially extend the service life of the tool.

7.1.1 MECHANICAL

Ref.: UMT007 General Assembly [AD-09817](#)

For a mechanical preventative check, complete these steps:

- 1 Remove dirt and old grease from the pressure housing threads and seals. Apply fresh grease.
- 2 Inspect the seals for damage or ageing/hardening and replace where required.
- 3 Check for:
 - Damaged wires.
 - Wires that are loose and likely to be damaged on re-assembly.
 - Damaged components.
 - Electrical components shorting to chassis.
 - Heat or chemical damage (discoloured components).
 - Incorrect thread grease or excessive quantity, see [Section 2.4.1, Greases and Sealants](#).
 - Cleanliness of connectors and loose/bent pins before replacing.
 - Loose screws/nuts/components/connectors.
 - Inspect the Canted Contact Spring ([item 12, 43014](#)) and replace when it shows any sign of damage.

Note: When RTV3140 ([P/N: T006-03140](#)) or RTV3145 ([P/N: T006-03145](#)) is used to secure loose components, it must be fully cured before the Pressure Housing ([item 2, 09817](#)) is replaced.

- 4 Check all fixings for tightness.

7.1.2 ELECTRICAL

For an electrical preventative check, complete these steps:

- 1 Make sure the tool current is <20mA @ 18VDC.
- 2 Connect to the Logging System and check for correct data. Apply some gentle vibration, rotation and invert the tool to expose potential failure.

- 3 With an appropriate logging profile running, check the line for +1.5VDC and -1.5VDC, 2µs pulses, with an oscilloscope.

Make sure to check for both the controller pulses and the tool response pulses (the controller pulses occur first). Pulses should have no ringing. When there is ringing, attach either an Ultrawire™ terminator at the bottom of the toolstring (e.g. Ultrawire™ Bullnose Terminator (BUL013) or a suitable Ultrawire™ bottom end flowmeter).

7.1.3 SEAL REPLACEMENT RECOMMENDATIONS

Reference: UMT007 General Assembly [AD-09817](#)
Electronics Assembly [AD-43014](#)

Refer also: [Section 4.4, Post Logging Checks.](#)

GE Oil & Gas recommend that all the primary seals are replaced after every run or six months when the tool is not in use.

Secondary seals should be replaced under these situations:

- 25 runs or sooner when damaged.
- one year when not in use.
- when the tool is run in a well with temperatures >150°C (302°F).
- when exposed to H₂S or CO₂.

Anti-Extrusion Rings (Back-up Rings) should be cleaned and checked every time the seals are replaced. It is recommended that they are replaced every 25 runs or sooner when damaged. Refer to [Appendix C, Fitting of Anti-Extrusion Rings](#) for the correct fitting of the Anti-Extrusion Rings.

Primary Seals:

- Two O-Rings ([item 12, 09817](#))
- Two O-Rings ([item 11, 09817](#))

Secondary Seals and Anti-Extrusion Rings (Back-up Rings):

- One O-Ring ([item 13, 09817](#))
- One O-Ring ([P/N: 99012](#))
- Two Backup Rings ([item 6, 09817](#))
- Two Backup Rings ([item 7, 09817](#))

7.1.4 AGEING OF ELECTRONICS

At 150°C (302°F), significant electronic ageing failures are expected after 4000hrs typical use, hence PCB replacement should be considered at this point. Every additional 10°C (18°F) halves the time. Ageing of the electronics is also accelerated by vibration and corrosive gas inside the chassis. Visual inspection and logging previous history is recommended, but is unlikely to predict premature failure. Tools that may be suspected of reliability problems due to age or unusual log response may be heated to 120°C (248°F), which would not normally age the electronics, and afterwards subjected to moderate vibration. A moderately hard blow from a wooden hammer is recommended.

DO NOT USE METAL HAMMERS.

7.1.5 HEAT TESTING ABOVE 150°C (302°F)

This is not generally recommended since it shortens tool life expectancy. Heat testing may be required for contractual reasons, tool out of use for a long period, or job with unusually high well temperature. The test should be carried out slightly above expected well temperature only and the tool should not be kept at temperature for more than 1 hour. Do not exceed the maximum rated temperature for the tool.

7.2 Extraordinary Maintenance

7.2.1 REPLACEMENT OF THE PLUG-IN MEMORY MODULES

**CAUTION!****ELECTROSTATIC DISCHARGE!**

Refer to [Section 2.6, Electrostatic Discharge \(ESD\)](#).

In the life of the UMT007 the two Memory Modules ([P/N: 82189S](#)) may start to fail, particularly when the UMT007 is exposed to extended periods at high temperature. This is indicated by an increase in errors in the data. The UMT007 hardware and software have the ability to detect and correct these errors, but the Ultrawire™ Memlog software will give a warning when the number of errors reaches a pre-determined threshold and the user is advised to replace the Memory Modules at the next convenient opportunity.

GE Oil & Gas recommend the Memory Modules are replaced as pairs.

7.2.1.1 Removal of the Plug-In Memory Modules

Ref.: UMT007 General Assembly [AD-09817](#)
Electronics Chassis [AD-43014](#)

Note: All Part Numbers refer to the Electronics Chassis (AD-43014), unless specified otherwise.

To remove the two memory modules, complete these steps:

- 1 Remove and retain the Pressure Housing ([item 2, 09817](#)). Refer to [Section 5.2.1, Removal](#).
- 2 Remove and retain the four Csk Hd Slotted Screws ([item 19](#)) and the two Csk Hd Slotted Screws ([item 20](#)) that retain one of the Electronic Chassis ([item 2](#)).

Make sure the two Csk Hd Slotted Screws ([item 20](#)) in the centre are kept separate as they are shorter.

- 3 On the Processor Board Assembly ([item 8](#)), identify the Memory Module ([P/N: 82189S](#)) that is to be replaced. See [Figure 7.1](#).

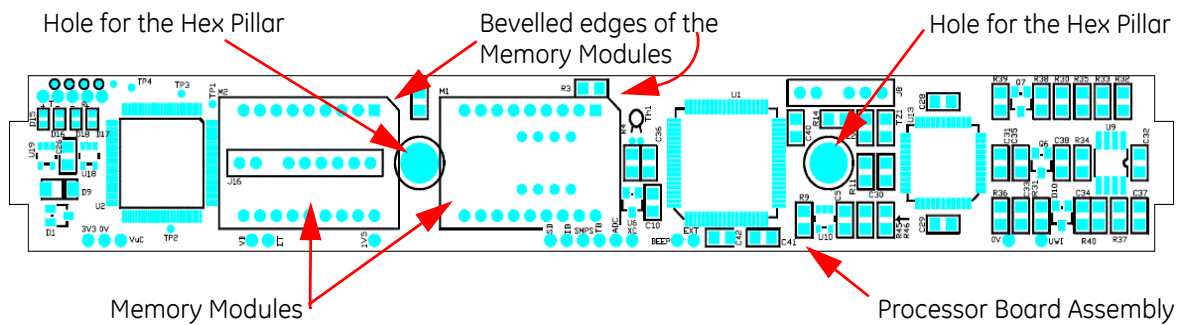


Figure 7.1 Identification of the two Memory Modules

- 4 Use suitable non-conductive levers to remove carefully the Memory Module to be replaced.
Lever on the two long sides until the Memory Module is free.
- 5 Repeat [Step 3](#) and [Step 4](#) to remove the second Memory Module.

7.2.1.2 Installation of the Plug-In Memory Modules

- 1 Make sure all components are clean, dry and free from contamination.
- 2 Insert the new Memory Module in the correct location on the Processor Board Assembly ([item 8](#)).

Make sure the bevelled corner of the Memory Module matches the silk screen outline on the Processor Board Assembly. See [Figure 7.1](#).
- 3 Cut from the Pad Material ([P/N: 414248](#)) a rectangle with a dimension of 20mm x 15mm.
- 4 Remove and discard the blue backing paper from the Pad Material.
- 5 Apply the white side (sticky side) of the Pad Material to the surface of one of the new Memory Modules ([P/N: 821895](#)).
- 6 Repeat [Step 2](#) through [Step 5](#) for the second Memory Module.
- 7 Locate correctly the Electronics Chassis ([item 2](#)) on the Upper Bulkhead ([item 3](#)) and the Lower Bulkhead ([item 1](#)).
- 8 Install the four Csk Hd Slotted Screws ([item 19](#)) to secure the Electronics Chassis to the two Bulkheads.
- 9 Install the two Csk Hd Screws ([item 20](#)) to secure the Electronics Chassis to the two Hex Pillars ([item 14](#)).
- 10 Install the Pressure Housing ([item 2, 09817](#)). Refer to [Section 5.2.2, Installation](#).

7.3 Troubleshooting

Refer to [Section 5, Mechanical Description](#) and [Appendix B, Drawings & Parts List](#) where necessary.

An oscilloscope, multimeter and other basic test equipment will be required.

Table 7.1 Troubleshooting checklist

<p>Initial inspection</p>	<p>Check for:</p> <ul style="list-style-type: none"> • Damaged wires. • Damaged components. • Electrical components shorting to chassis. • Heat or chemical damage (discoloured components). • Incorrect thread grease or excessive quantity, see 2.4, Tool Integrity. • Check any connectors for cleanliness and loose/bent pins before replacing. <p>Check also all the fixings are tight.</p>
<p>Not operating</p>	<p>Check the connections to the MBH.</p> <p>Check the UMT007 works with Ultrawire™ Memlog software. Can a profile be loaded?</p> <p>What does Ultrawire™ Memlog software show in response to "Get Tool Info"?</p> <p>With the UMT007 disconnected from the toolstring and from the MBH, connect an 18VDC power supply (current limited to 200mA) via the Canted Contact Spring (item 12, 43014) (see Figure 5.3) and the tool housing. The Canted Contact Spring is positive and the tool housing is negative. The quiescent current should be between 10mA and 25mA.</p>
<p>Little or no current</p>	<p>Check the fuse (F1) on the UMT007 PSU board - Part A of PCB 87455 (item 8, 43014).</p>
<p>Power supply is current limiting</p>	<p>Check for short-circuits on the PCBs and the connectors.</p>
<p>Current within range, but not operating</p>	<p>Check the output of the two oscillators U6 is 8MHz (±2kHz).</p> <p>When the above is OK, re-load the UMT007 firmware using Ultrawire™ Memlog software.</p>

APPENDIX A EQUIPMENT & RECOMMENDED SPARES**A.1 Main Equipment**

Part No	Description	Qty	Remarks
UMT007	Ultrawire™ Memory Tool, 1 ¹¹ / ₁₆ " , 20kpsi, 1GB	1	---

A.2 Ancillary Equipment

Part No	Description	Qty	Remarks
UMU001	Ultrawire™ Memory Control Unit	1	Refer to MN-UMU001
---	PC/Laptop/Notebook running Windows® with a USB connection	1	Refer to MN-UWMemlog for further details

A.3 Maintenance Equipment**A.3.1 CONSUMABLES**

Part No	Description	Qty	Remarks
LOR101	Liquid-O-Ring® type 101 Lubricant for greasing O-Ring seals	1	5oz pot
LOR101L	Liquid-O-Ring® type 101 Lubricant for greasing O-Ring seals	1	16oz pot
91064	Loctite® 243 Thread lock liquid	1	10ml bottle
T006-03140	Dow Corning® 3140 RTV	1	90ml tube
T006-03145	Dow Corning® 3145 RTV	1	90ml tube

A.3.2 FIELD HANDLING TOOLS

Part No	Description	Qty	Remarks
91050	Hand Tool Kit for 1 ¹¹ / ₁₆ " tools	1	---

A.4 Recommended Spares

Part No	Description	Qty	Remarks
KITB-UMT007	Basic Spares Kit	1	---
KITR-UMT007	25-Run Spares Kit	1	---

Part No	Description	Qty	Remarks
82189S	Memory Module	2	For use on the Processor Board Assembly (item 8, 43014)
414248	GAP PAD VO-U/S, 0.040", 4"x4" Sheet (Pad Material)	1	For use with the Memory Modules (P/N: 82189S) Enough for thirty (30 approx.) individual pads
99012	O-Ring	1	For use on MonoConn Female Connector (item 8, 09817)

PARTS LISTING	
Part	Issue
KITB-UMT007	
A	
Description	
KIT, SPARES, BASIC, UMT007	

PARTS LIST					
Item	Part No	Description	Qty	Units	Remarks
0010	99124	O-ring 124 Viton 90	2	EA	
0020	99118	O-ring 118 Viton 90	2	EA	

PARTS LISTING	
Part	Issue
KITR-UMT007	
A	
Description	
KIT, SPARES, REC'D (25 RUN), UMT007	

PARTS LIST					
Item	Part No	Description	Qty	Units	Remarks
001	99118	O-ring 118 Viton 90	50	EA	
002	99124	O-ring 124 Viton 90	50	EA	
003	410084	RING BACKUP FOR 118 O RING	10	EA	
004	410085	RING BACKUP FOR 124 O RING	10	EA	
005	93893	RING RETAINING INT. SPIRAL 14mm SS	2	EA	
006	95211	O-ring 211 Viton 75	2	EA	
007	93011	Scr Grb Skt Hd M5x05mmLG SS-A2 (DIN 916)	3	EA	
008	93906	SPRING WAVY Ø19mm 3.05FL 35N/mm	2	EA	
009	93902	SPRING CANTED COIL 12.0MM ID	2	EA	
010	93905	RING RETAINING EXT. SPIRAL 15mm SS	2	EA	
011	01029	Screw Csk Hd(Slotted) M3 x 06mm LG SS	8	EA	
012	93058	Scr Csk Hd Sltd M3x04mm SS-A2 (DIN 963)	4	EA	

PARTS LISTING	
<i>Part</i>	<i>Issue</i>
91050	C
<i>Description</i>	
Tool Kit for all 1 11/16 Tools SX and GO	

PARTS LIST					
<i>Item</i>	<i>Part No</i>	<i>Description</i>	<i>Qty</i>	<i>Units</i>	<i>Remarks</i>
001	91005	Spanner Open Ended 42mmx38mm	2	EA	
002	91019	Spanner C 50mm 35mm	2	EA	
003	10038	Spanner Box 3/8 x 5/16 Modified	2	EA	
004	91028	Spanner O/E 3/8x5/16	1	EA	
005	93876	Spanner Single Open End 18mm	1	EA	
006	91029	Key, Hex Metric (Set)	1	EA	
007	91030	Punch Pin Parallel set	1	EA	
008	00615	Assy Spanner PKJ	1	EA	
009	91293	Screwdriver Parallel tip (3 0 x 75)	1	EA	
010	91105	Toolroll With SX Badge Large Black	1	EA	
011	91104	Screwdriver Parallel tip (5 5 x 200)	1	EA	
012	91103	Pliers Circlip 812 Chrome/Van	1	EA	
013	91102	Pliers Mini Flat Nose 5 Inch	1	EA	
014	10037	Bar Tommy	2	EA	
015	10051	Kemlon tool Sondex - 4BA Hex Socket	1	EA	
016	91280	Hammer, 4oz ball pein	1	EA	
017	91130	Pin C Spanner 35-50mm	1	EA	
018	91822	Medium Flat Blade Screwdriver, 5mm	1	EA	
019	91255	T15 Torx driver, Sandvik Belzer 8915	2	EA	

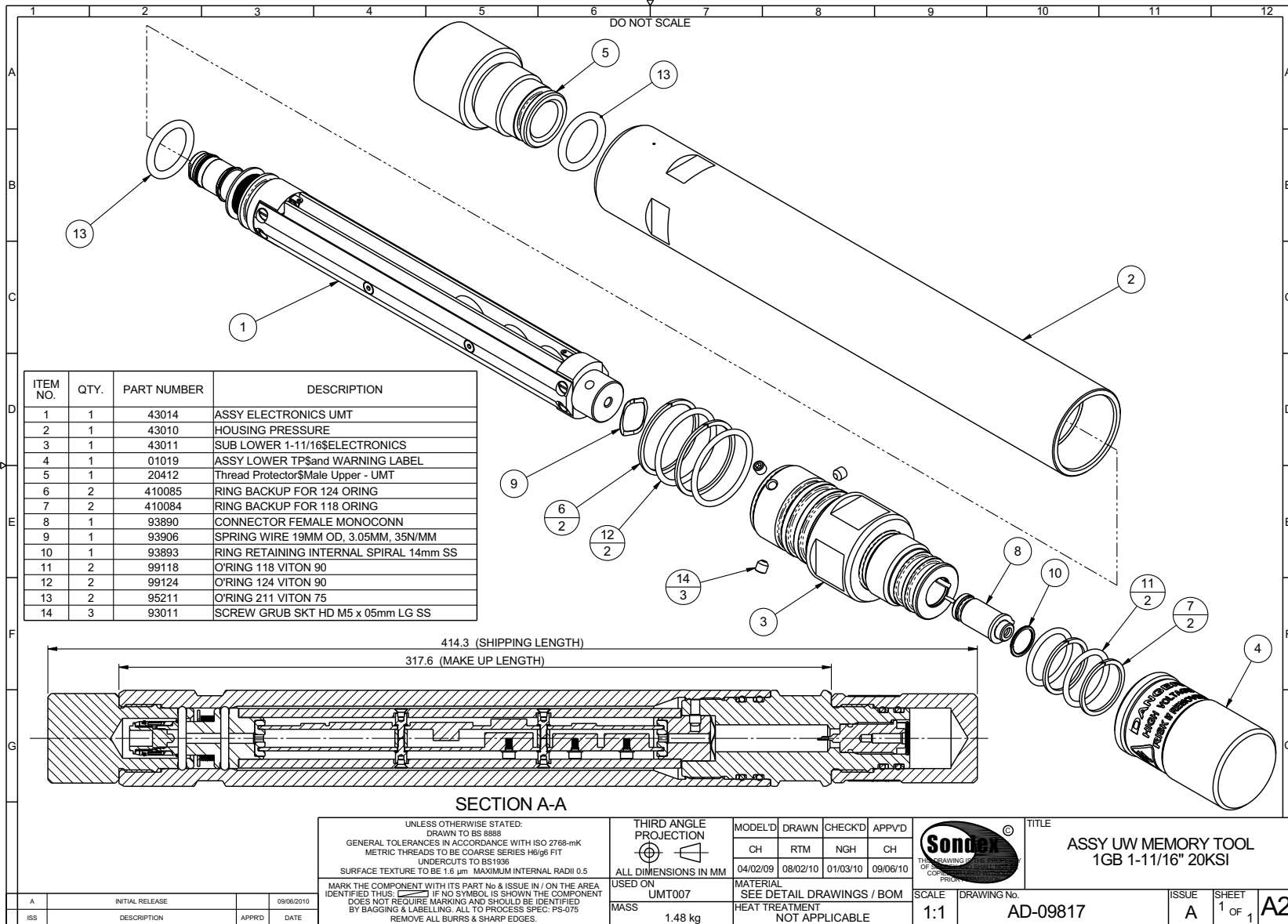
APPENDIX B DRAWINGS & PARTS LIST

B.1 Mechanical Drawings

Description	Drawing	Parts List
Ultrawire™ Memory Tool, 1 ¹¹ / ₁₆ " , 20KSI, 1GB consists of:	AD-09817-A	See Drawing
Electronics Assembly	AD-43014-C	See Drawing

B.2 Electrical Drawings

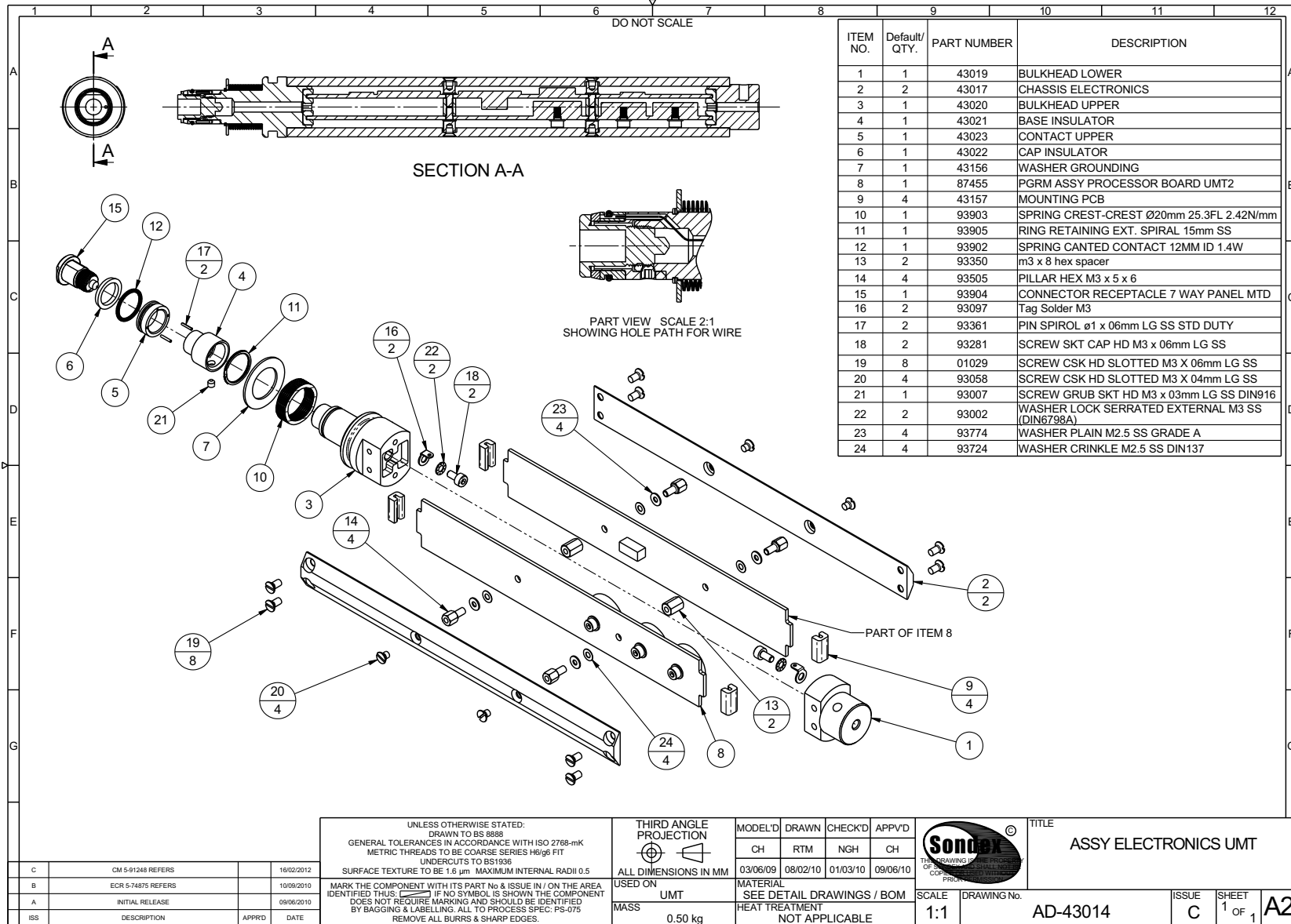
Description	Type	Drawing
UMT Wiring Diagram	Wiring Diagram	WD-82196-Fx
UMT Circuit Diagram (5-sheets)	Circuit Diagram	CD-82196-Fx



Ultrawire™ Memory Tool

UMT007

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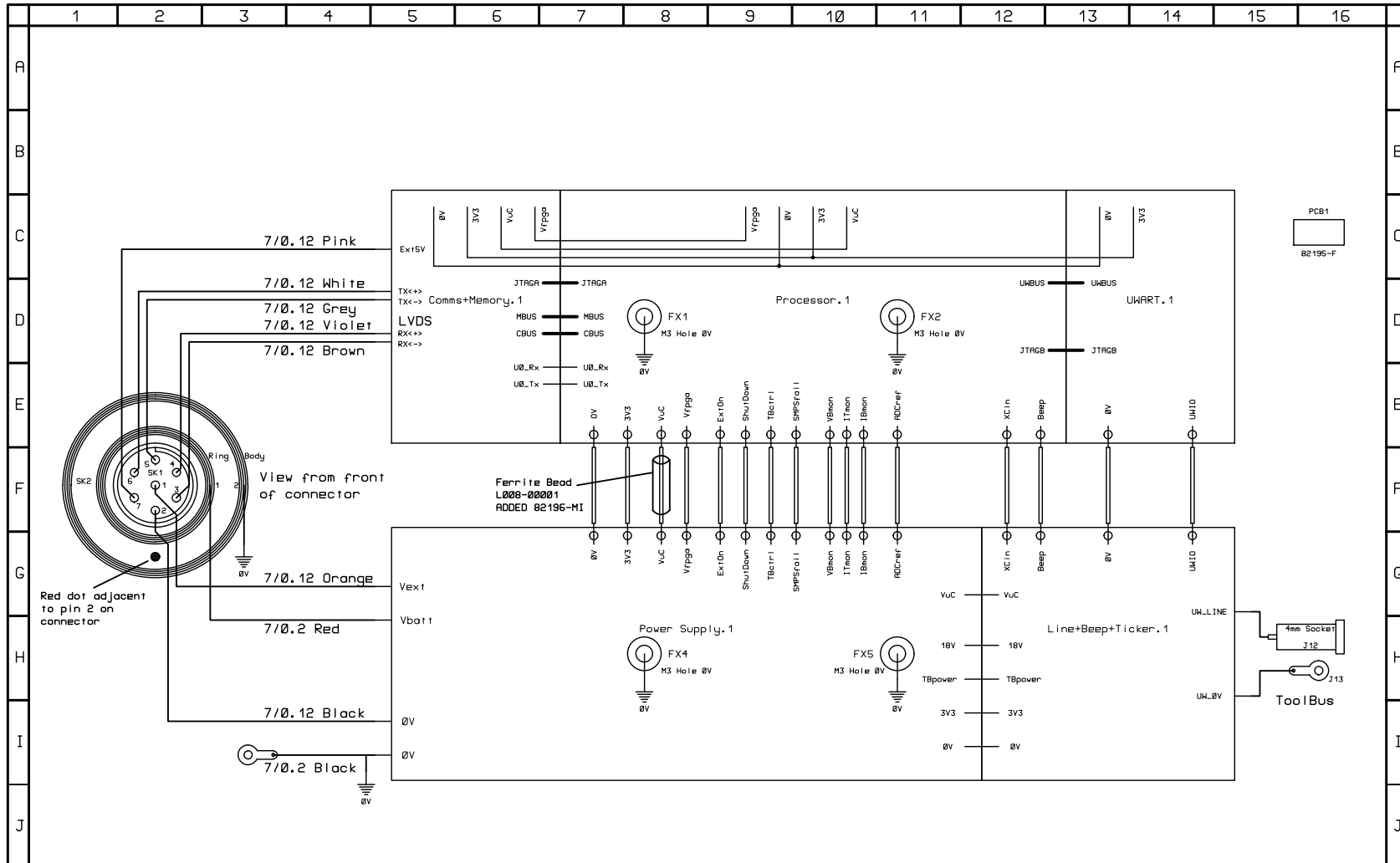


C		CM 5-91248 REFERS	16/02/2012	UNLESS OTHERWISE STATED: DRAWN TO BS 8888 GENERAL TOLERANCES IN ACCORDANCE WITH ISO 2768-mK METRIC THREADS TO BE COARSE SERIES H6/g6 FIT UNDERCUTS TO BS1936 SURFACE TEXTURE TO BE 1.6 µm MAXIMUM INTERNAL RADII 0.5 MARK THE COMPONENT WITH ITS PART No & ISSUE IN / ON THE AREA IDENTIFIED THUS: IF NO SYMBOL IS SHOWN THE COMPONENT DOES NOT REQUIRE MARKING AND SHOULD BE IDENTIFIED BY BAGGING & LABELLING. ALL TO PROCESS SPEC: PS-075 REMOVE ALL BURRS & SHARP EDGES.	THIRD ANGLE PROJECTION ALL DIMENSIONS IN MM	MODEL/D	DRAWN	CHECK/D	APPV/D		TITLE				
B	ECR 5-74875 REFERS	10/09/2010	CH			RTM	NGH	CH	ASSY ELECTRONICS UMT						
A	INITIAL RELEASE	09/08/2010	USED ON			03/06/09	08/02/10	01/03/10	09/06/10		MATERIAL	SCALE	DRAWING No.	ISSUE	SHEET
ISS	DESCRIPTION	APPRD	DATE			UMT	SEE DETAIL DRAWINGS / BOM	HEAT TREATMENT	NOT APPLICABLE		1:1	AD-43014	C	1 OF 1	A2

Ultrawire™ Memory Tool

UMT007

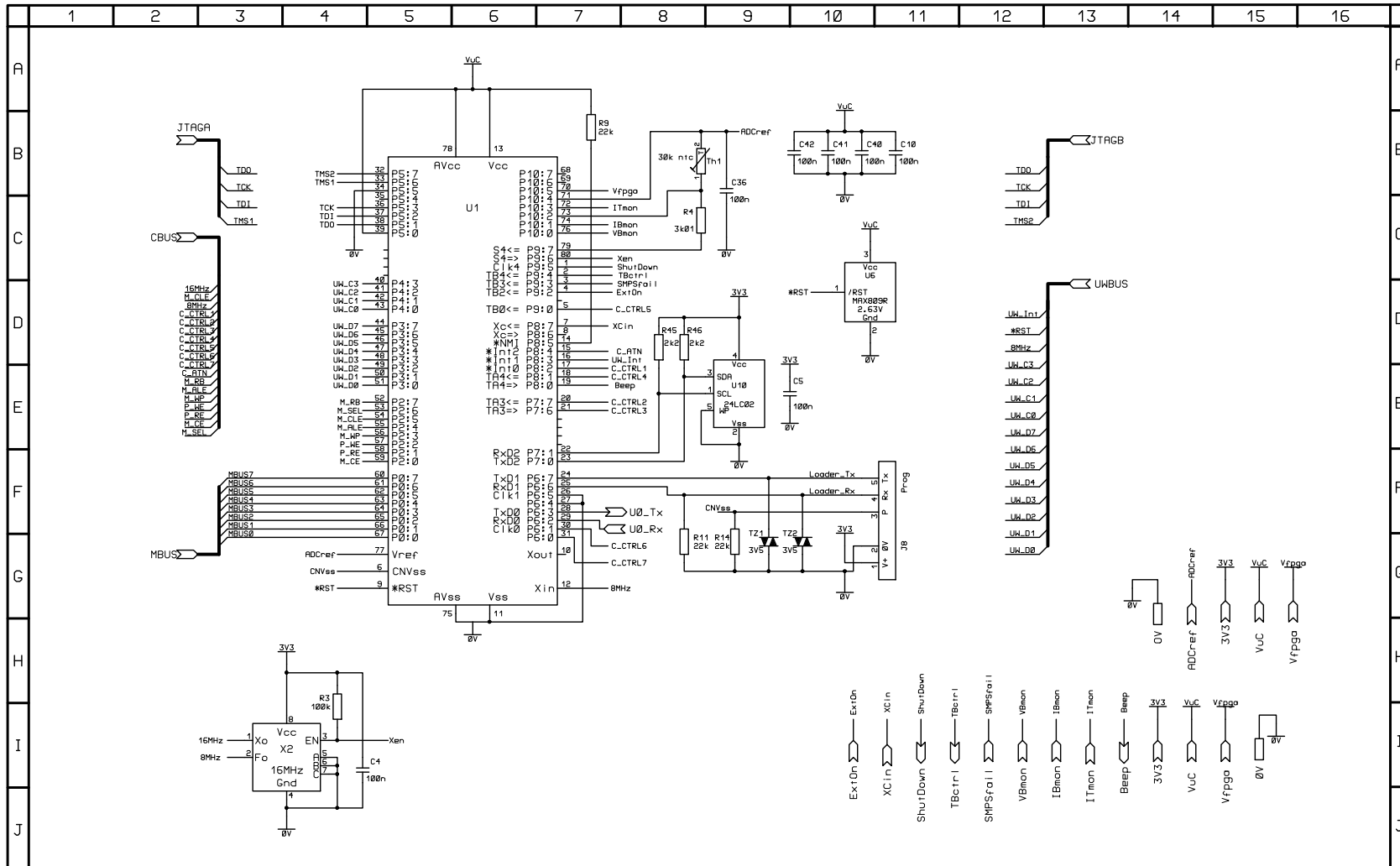
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ISS.	REV.	ECR NUMBER, REMARKS	CHKD	APPR	DATE	TITLE	DRAWING NUMBER	ISSUE	REVISION
A		Prototype			28/11/08	GE Oil & gas UMT Wiring Diagram	WD-82195	Fx	
B		Initial Release			30/05/09		DRAWN	CHECKED	APPROVED
C		New artwork			02/12/09		KW	BET	(JG)
D		Revised artwork	KW	KW	2/05/10		DATE	DATE	DATE
E		ECR5-73374 Values changed	KW	KW	23/07/10		28/11/08	28/11/08	20/05/10
F		Changes ECR5-76063,89384,91903	MN	MN	21/03/12		SHEET	1	OF

Ultrawire™ Memory Tool

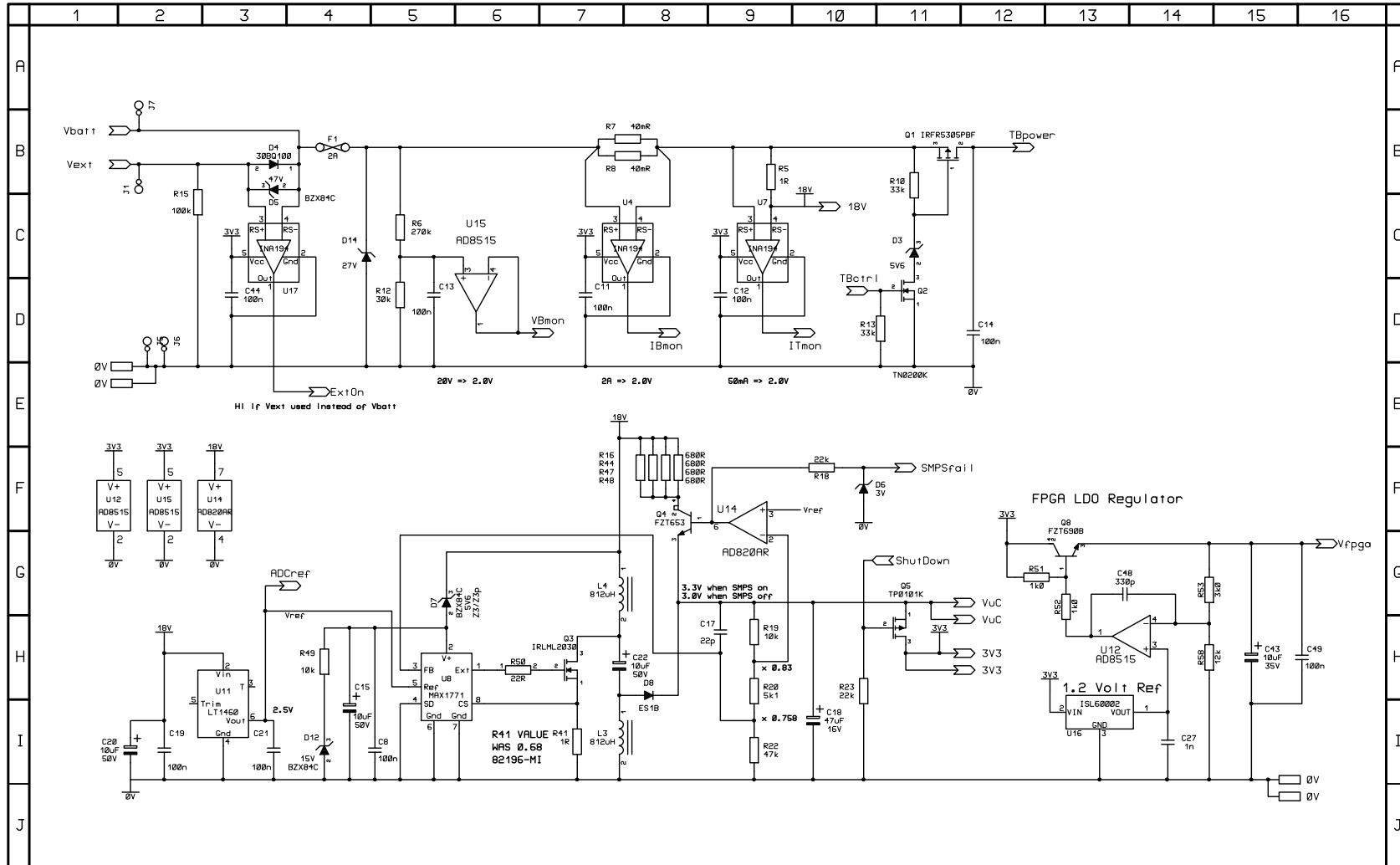
UMT007



ISS. REV.	ECR NUMBER, REMARKS	CHKD	APPR	DATE	GE Oil & Gas	UMT Processor Circuit Diagram	DRAWING NUMBER	ISSUE	REVISION	
A	Prototype			28/11/08			CD-82196	Fx		
B	Initial Release			30/06/09						
C	New artwork			02/12/09						
D	Revised artwork	KW	KW	2/06/10						
E	ECRS-73374 Values changed	KW	KW	23/07/10						
F	Changes ECR 5-76063, 89384, 91903	MN	MN	21/03/12	This document contains proprietary information. Copyright 2012 © Sondex Ltd.		DRAWN	CHECKED	APPROVED	
							KW	BET	(JG)	
							DATE	DATE	DATE	
							28/11/08	28/11/08	20/05/10	
							SHEET	1	OF	5

Ultrawire™ Memory Tool

UMT007



ISS.	REV.	ECR NUMBER, REMARKS	CHKD	APPR	DATE
A		Prototype			28/11/08
B		Initial Release			30/06/09
C		New artwork			02/12/09
D		Revised artwork	KW	KW	2/06/10
E		ECRS-73374 Values changed	KW	KW	23/07/10
F		Changes ECR 5-76063, 89384, 91903	MN	MN	21/03/12

GE Oil & Gas

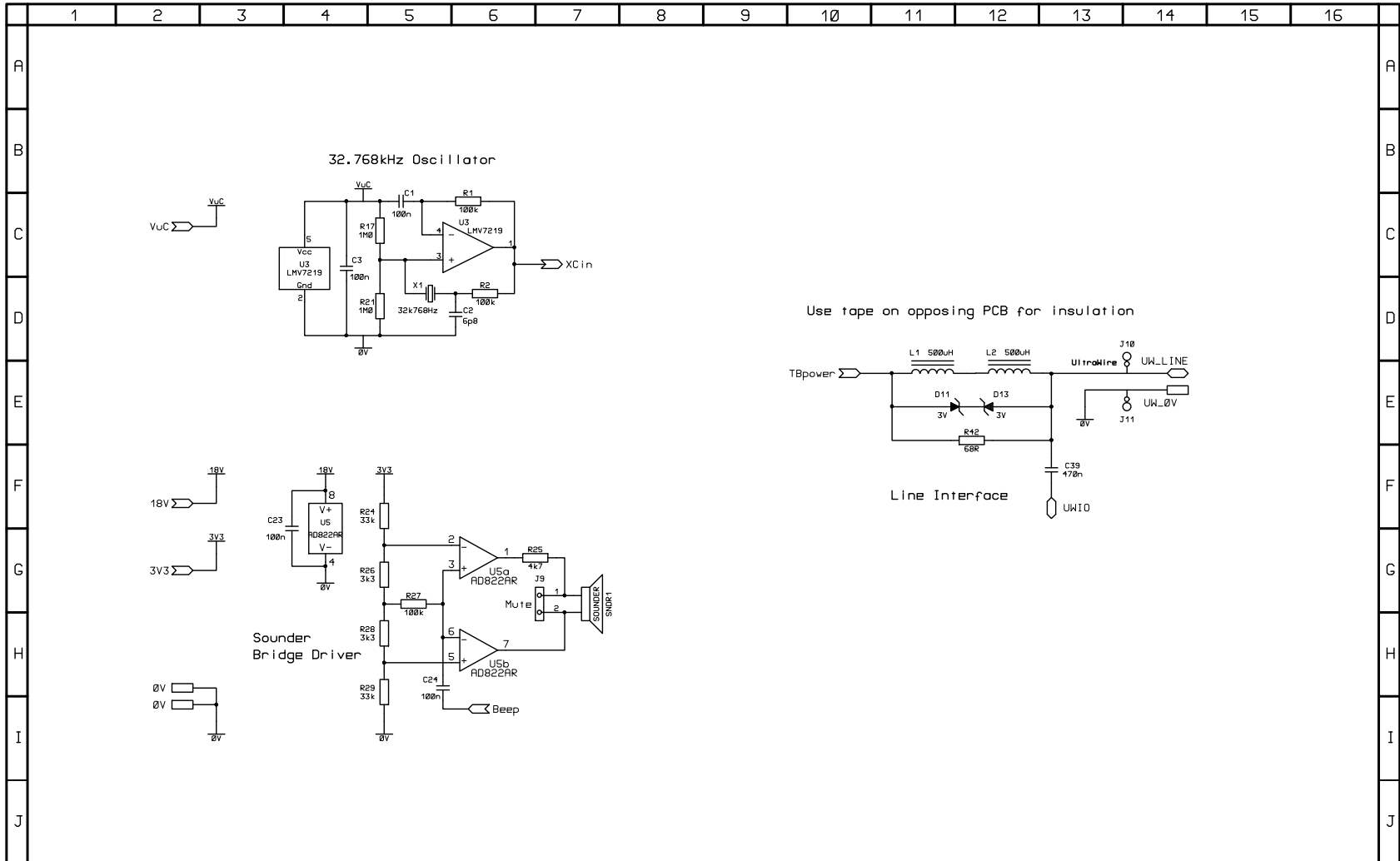
TITLE
 UMT
 PSU & Monitor
 Circuit Diagram

DRAWING NUMBER CD-82196		ISSUE Fx	REVISION
DRAWN KW	CHECKED BET	APPROVED (JG)	
DATE 28/11/08	DATE 28/11/08	DATE 20/05/10	
SHEET 2		OF 5	

Ultrawire™ Memory Tool

UMT007

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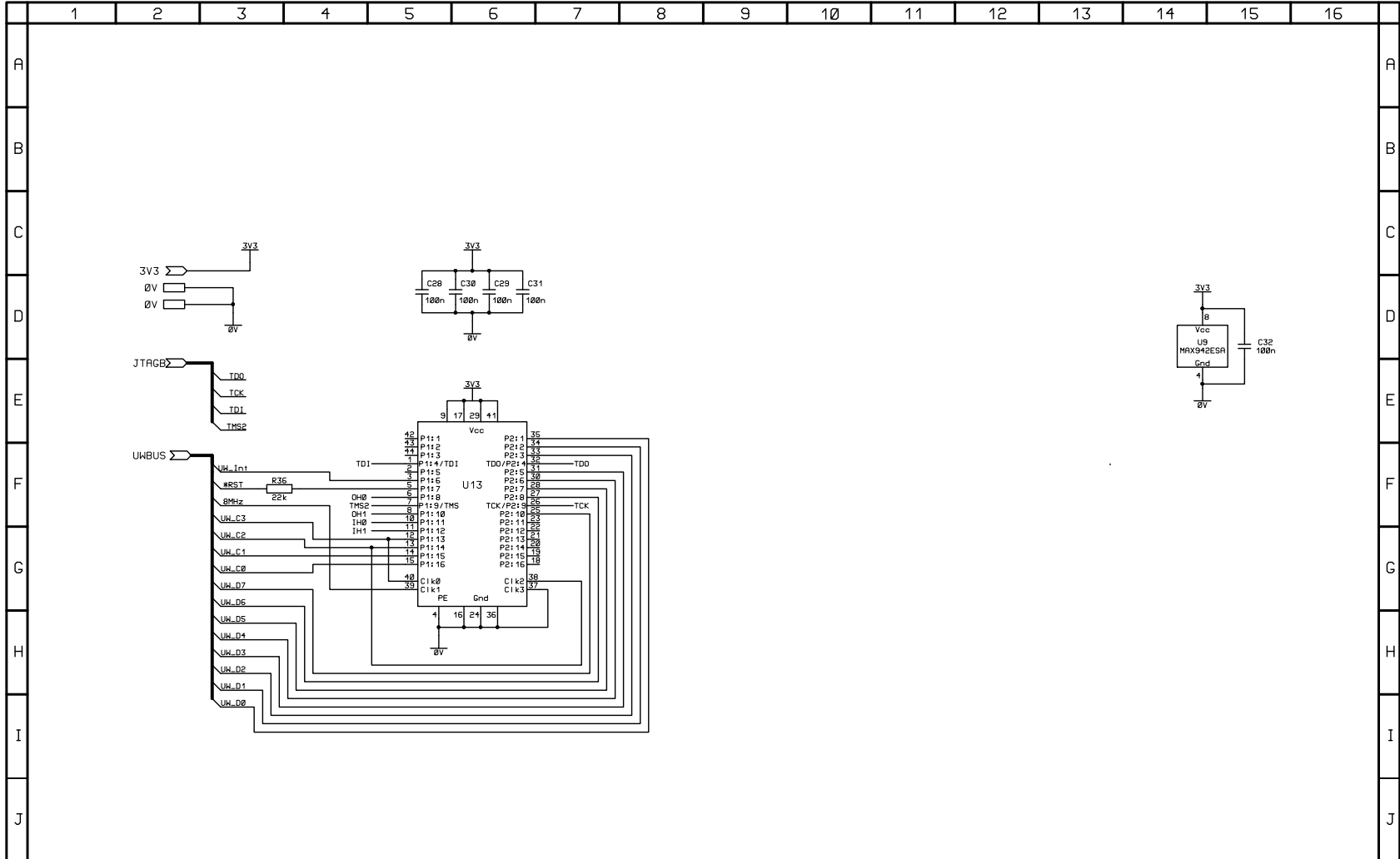


ISS.	REV.	ECR NUMBER, REMARKS	CHKD	APPR	DATE	TITLE	DRAWING NUMBER	ISSUE	REVISION
A		Prototype			28/11/08	GE Oil & Gas UMT Line Int. & Sounder Circuit Diagram	CD-82196	Fx	
B		Initial Release			30/06/09		DRAWN	CHECKED	APPROVED
C		New artwork			02/12/09		KW	BET	(JG)
D		Revised artwork	KW	KW	2/06/10		DATE	DATE	DATE
E		ECRS-73374 Values changed	KW	KW	23/07/10		28/11/08	28/11/08	20/05/10
F		Changes ECR 5-76063, 89384, 91903	MN	MN	21/03/12		SHEET 3 OF 5		

Ultrawire™ Memory Tool

UMT007

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ISS.	REV.	ECR NUMBER, REMARKS	CHKD	APPR	DATE
A		Prototype			28/11/08
B		Initial Release			30/06/09
C		New artwork			02/12/09
D		Revised artwork	KW	KW	2/06/10
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F		Changes ECR 5-76063, 89384, 91903	MN	MN	21/03/12

GE Oil & Gas

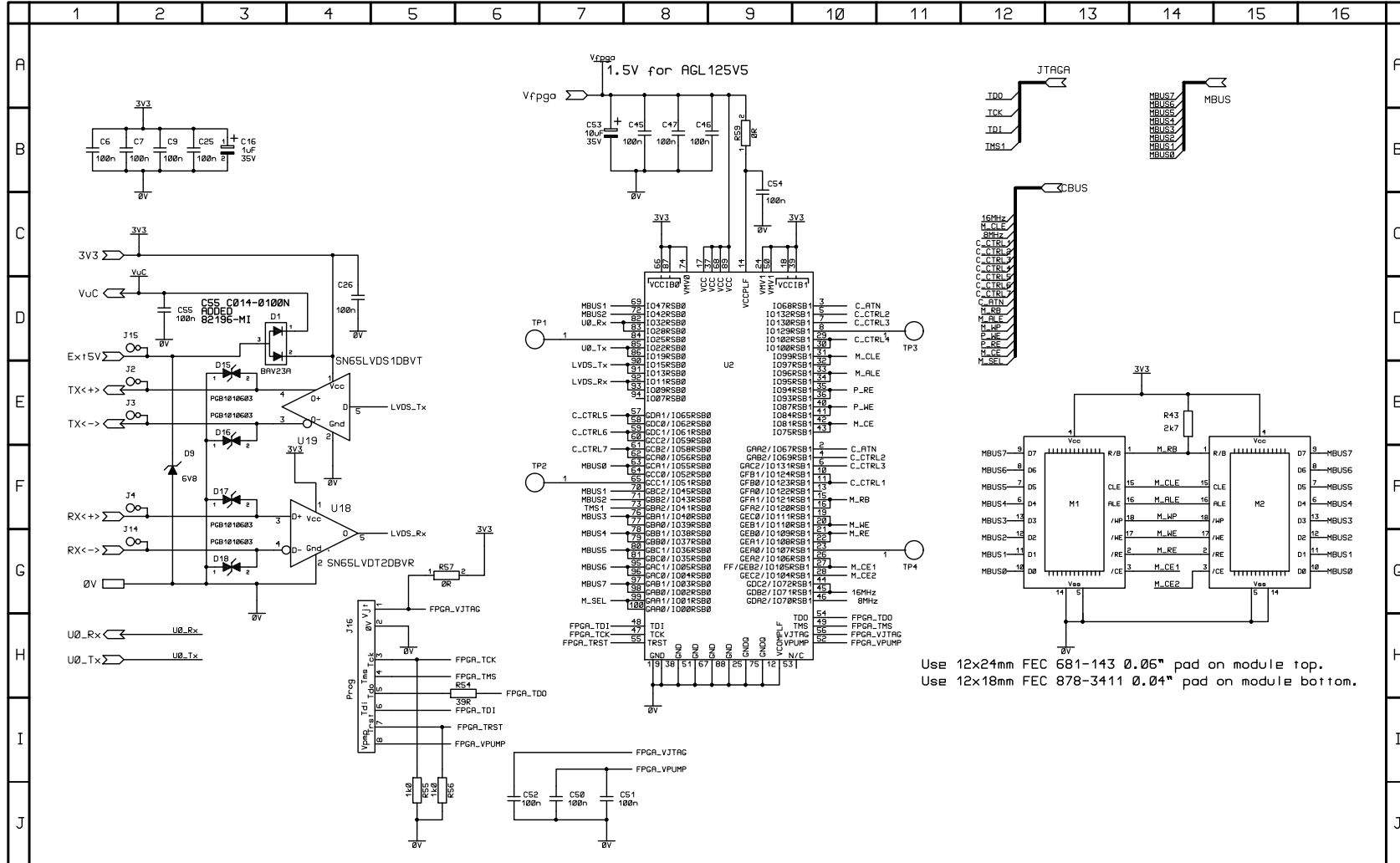
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 Ultrawire Interface
 Circuit Diagram

DRAWING NUMBER		ISSUE	REVISION
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DRAWN	CHECKED	APPROVED	
KW	BET	(JG)	
DATE	DATE	DATE	
28/11/08	28/11/08	20/05/10	
SHEET 4 OF 5			

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Ultrawire™ Memory Tool

UMT007



Use 12x24mm FEC 681-143 0.06" pad on module top.
 Use 12x18mm FEC 878-3411 0.04" pad on module bottom.

ISS. REV.	ECR NUMBER, REMARKS	CHKD	APPR	DATE
A	Prototype			28/11/08
B	Initial Release			30/06/09
C	New artwork			02/12/09
D	Revised artwork	KW	KW	2/05/10
E	ECRS-73374 Values changed	KW	KW	23/07/10
F	Changes ECR 5-76063, 89384, 91903	MN	MN	21/03/12

TITLE
 UMT
 USB Interface
 Circuit Diagram

GE Oil & Gas

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DRAWING NUMBER	ISSUE	REVISION
CD-82196	Fx	
DRAWN KW	CHECKED BET	APPROVED (JG)
DATE 28/11/08	DATE 28/11/08	DATE 20/05/10
SHEET 5 OF 5		

APPENDIX C FITTING OF ANTI-EXTRUSION RINGS

At high temperatures O-Rings become very soft and with corresponding high pressures they begin to extrude into the gap between the housing and the bore. Eventually this can lead to failure and a subsequent tool flood. To prevent this, Anti-Extrusion Rings (Backup Rings) have been added to all seals on this tool, both static and dynamic. These are made of plastic and plug the extrusion gap. Anti-Extrusion Rings must always be fitted on the side **AWAY** from the well pressure (see [Figure C.1](#) below).

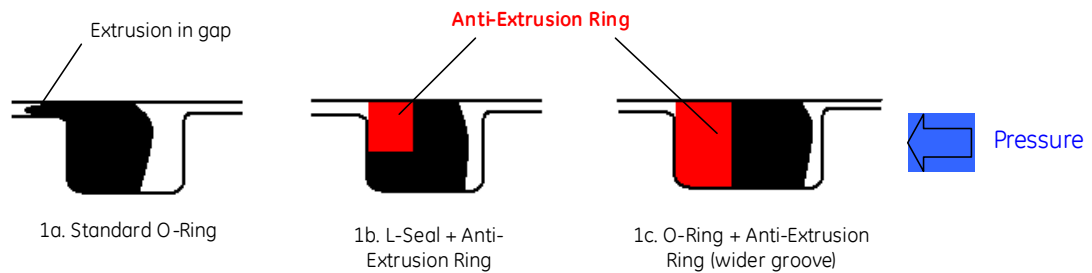


Figure C.1 Installation of the Anti-Extrusion Rings

Anti-Extrusion Rings are scarf cut to allow assembly:

Make sure the Anti-Extrusion Rings are concentric in their groove and they are seated uniformly.

Make sure the gap between the scarf cut (of the Anti-Extrusion Ring) is no more than 1mm.

Note: Anti-Extrusion Rings are referred to as backup rings, particularly when used with standard O-Rings.

Note: Due to the increased friction, joints that contain Anti-Extrusion Rings will be slightly harder to tighten up than previously with just the O-Rings. However, do **NOT** force the joint together. This indicates that part of the Anti-Extrusion Ring may be caught on either the bore or the lead-in chamfer and excessive force may damage the ring and/or the seal. Slowly back off the joint, check the seating of the Anti-Extrusion Ring and retighten.

APPENDIX D UMT SOUND LIBRARY

This manual (in *.pdf format) contains a range of sounds that can be expected during operation of the UMT007. To listen to a sound, clicking on the **paper-clip** (refer to either [Figure D.1](#) or [Figure D.2](#)) in the displayed PDF file to open the attachments (when not open already). This will display a selection of sound clips (in *.wav format) that can be played when they are clicked.

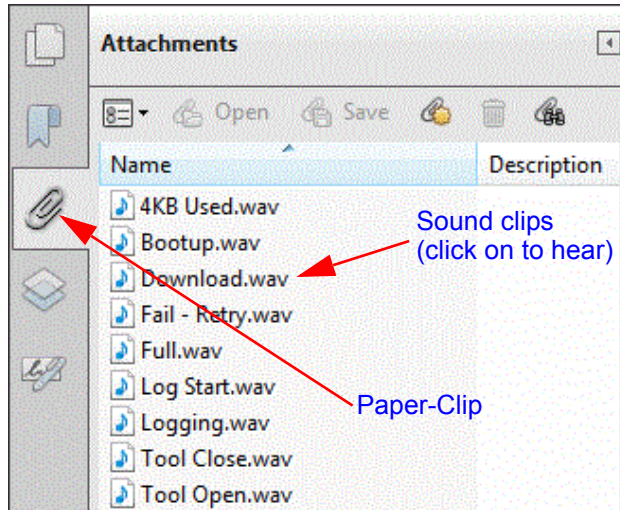


Figure D.1 Location of the **paper-clip** in the PDF file (Adobe Acrobat X Pro) (typical example of *.wav files)

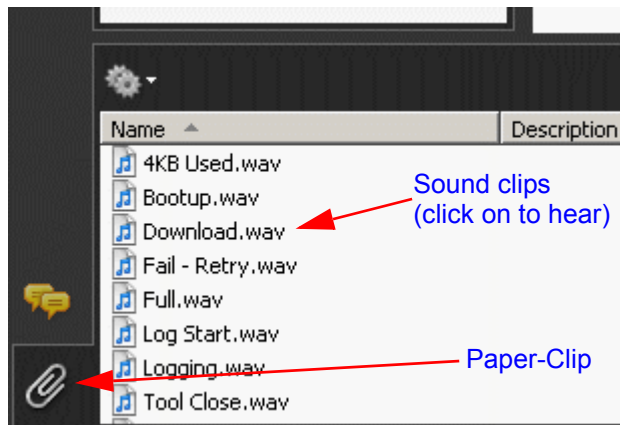


Figure D.2 Location of the **paper-clip** in the PDF file (earlier versions of Adobe Acrobat) (typical example of *.wav files)

These sounds are available:

Sound Name	Occurs
Bootup	During boot up
Fail - Retry	When an Open or Close fails and is retried
Memory Full	When the tool memory is full
Log Start	When the Logging sequence starts
Tool Open	When the Tool Open command is sent
Tool Close	When the Tool Close command is sent
Logging	While the Logging sequence is in progress
4KB Used	This is heard every time 4kB of memory is used

APPENDIX E MBH UPGRADE FOR UMT TYPE 2 TOOLS

E.1 WHICH MBH ADAPTORS TO USE WITH UMT TYPE 2 TOOLS

UMT Type 2 tools (i.e.: UMT007 and UMT008) have a different connection method to the battery for improved reliability and easier connection. To enable existing MBH tools to be run with the UMT Type 2 tools, a replacement Adaptor should be ordered. The three types of Adaptor are:

- AMB004 - Adaptor 1¹¹/₁₆" MBH to UMT007 (15kpsil).
- AMB005 - Adaptor 1³/₈" MBH to UMT008 (15kpsi).
- AMB006 - Adaptor 1¹¹/₁₆" MBH to UMT007 (20kpsi).

To determine which Adaptor is to be used with the new MBH, refer to [Table E-1](#). For more information on Adaptors, refer to the Adaptor Manual ([MN-ADAPTOR](#)).

Table E-1 Upgrade existing MBH tools as follows

Existing MBH Tool	Description	Replacement Adaptor	MBH Equivalent for UMT Type 2 Tools	Pressure Rating	Compatible With...
MBH014	1 ¹¹ / ₁₆ ", MBH, 5C	AMB004	MBH030	15kPSI	UMT007 & UMT008
MBH024	1 ³ / ₈ ", 5C, 15kPSI, 1 ¹⁵ / ₁₆ ", 10 UNS 2A	AMB005	MBH031	15kPSI	UMT007 & UMT008
MBH025	1 ¹¹ / ₁₆ ", 1 ¹⁵ / ₁₆ ", 10 UNS, 5CC	AMB005	MBH032	15kPSI	UMT007 & UMT008
MBH029	1 ¹¹ / ₁₆ ", 5CC, 20kPSI	AMB006	MBH033	20kPSI	UMT007 & UMT008

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