March 13, 2018

SUBJECT: MicroNet Family Product Support

The MicroNet family is Woodward's premier turbine control product for TMR, redundant, and simplex applications. With thousands of installed units, the MicroNet family is extremely important to Woodward and will be supported for the foreseeable future. Woodward continues to invest heavily in the MicroNet product line to ensure its market success and longevity. With this continued investment Woodward plans to extend the production life of the current platform to year 2030 and beyond.

Woodward has a long and successful track record of keeping modules available for 10-15 years and longer, even though many of the original electronic components have gone obsolete in that same time period. In many cases we introduce new modules with additional functionality to extend the life of this product line. In other cases we invest in inventory of obsolete parts or minor module redesigns to use alternate components.

There are times when Woodward will eliminate certain MicroNet component part numbers. This may be due to the availability of higher performance alternatives, or simple unavailability of electronic components. In these situations, Woodward supports its customers with either direct replacements or functional replacements. Direct replacements drop into older systems with no modifications. Functional replacements offer similar functionality but may require additional modifications such as software updates or replacement of additional modules.

The current status of the MicroNet family is summarized in the below Appendix.

When a product or module is "Rationalized" (end of life for new applications) with no direct replacement, Woodward provides an extended support plan for its customers. Typically Woodward announces the Rationalization in advance to give time to design the new component into new applications. To ensure long term support, spares and repairs will continue to be available for existing customers for as long as practical. Unless otherwise noted Woodward positons our business to follow the below general support plan after a product is declared End of Life:

Years 0-5 = Availability of Spares and Repairs
Years 5-10 = Repairs (based on available parts)
Years 10-20 = Replacement/Exchange with Service Stock if available (no repairs)

Due to the nature of electronic components, Woodward is often notified of last time buys for various components. Woodward strives to hold inventory or find alternative parts when electronic components are discontinued. However, there are times when components can simply not be obtained and where sufficient last-time buys cannot be made. In these cases, Woodward cannot always guarantee the rationalization support plan.

Regards,

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Appendix

MicroNet platform is available in many chassis and I/O configurations. The status of the product family is shown below.

Chassis and Power Supplies

MicroNet Simplex Chassis (5453-278) is still available for spare part usage on existing systems. There is no end-of-life date established.

MicroNet Simplex Power Supplies 5501-410, 5501-411, 5501-412 were inactivated in July 2005 and are no longer available for new or spare module applications. Repairs are being supported as components allows. Other newer MicroNet Simplex power supply models are still active and available for the foreseeable future.

MicroNet Plus Chassis - The MicroNet Plus platform was introduced in 2005 to offer users enhanced performance and the choice of simplex or dual redundant CPU modules. Most MicroNet Simplex customers have switched over to MicroNet Plus. The MicroNet Plus chassis and power supplies are the primary MicroNet offering for simplex and redundant control systems and will be offered for the foreseeable future.

MicroNet TMR Chassis and Main Power Supply modules - The MicroNet TMR platform was introduced in 1997 to offer triple module redundant fault tolerance for ultra-critical applications. As the MicroNet TMR platform continues to enjoy robust sales there are no plans to discontinue production of the current chassis or main system power supplies.

Kernel Power Supply 5466-318 Module (Used with CPU040 & CPU060 modules) – This power supply was introduced in 1997 and includes both power supply and dual-port RAM back plane communication functions. This module was replaced with a new kernel power supply module with faster dual-port RAM for faster CPU5200 communications on February 16, 2010. Refer to Woodward PCN (product change notification) # 06919 for more information on replacement and upgrade options.

CPU's and Operating Systems

CPU040 & CPU060 Modules (all part numbers) are no longer available but can be repaired as component availability allows. Optionally customers can upgrade their MicroNet, TMR or 5009 controllers to utilize Woodward's latest CPU5200 modules as desired. Note that upgrading TMR to the CPU5200 module will require a Kernel Power Supply and software upgrade also. Refer to Woodward PCN# 06919 for more information on replacement and upgrade options.

Pentium NT CPUs 5466-409, 5466-616, 5466-619 – (with real time NT operating system) were released in 1999 for use in the MicroNet Simplex platform. Since the release of Woodward's CPU5200 CPU module in 2005, sales of this module dramatically declined to the point that it was rationalized and a last time buy was offered to customers in 2009. New Pentium NT CPUs are no longer available. Woodward's CPU5200 CPU module is available as an upgrade for the Pentium NT CPU in MicroNet Simplex Control Systems. Please contact your control system supplier or Woodward directly to better understand your system's upgrade options.

Woodward will continue to repair and support Pentium NT CPU modules for the next several years as components are available.

CPU5200 CPU Modules - 5466-1245, 5466-1145, and 5466-1141 - The CPU5200 Enhanced Performance, CPU5200 Cyber-secure and CPU5200 Secure Application modules utilize the Freescale (Motorola) MPC5200 CPU and VxWorks real-time operating system. The 5200 CPU was first released with the MicroNet Plus platform in 2005. These modules are currently the base CPU for the MicroNet Plus, Plus-Redundant and MicroNet TMR product lines. There are no significant obsolescence issues at this time and Woodward currently plans to continue to sell these modules alongside the more powerful P1020 CPU until at least 2025.

The 5466-1035 and 5466-1045 CPU5200 modules (along with the matching -1036 and -1046 RTN modules) are non-preferred and should not be used on new installations. Please use the upgraded -1245 and -1145 CPU5200 versions listed above along with the -1246 and -1146 RTNs.

Note - CPU5200 modules may be used in older-style MicroNet Simplex chassis as an upgrade to the Pentium CPU's or CPU040's. Upgrading to CPU5200 module on these older systems will require a software upgrade. Other module changes may be necessary as well, depending on the modules being used. Contact Woodward for details.

P1020 CPU Modules – 5466-1510, 5466-1520 – The P1020 CPUs are next-generation high performance CPUs released in July 2016 for the MicroNet Plus platform. These CPUs include the NXP P1020 high speed dual-core processor, expanded memory, cyber security and enhanced communication capability. The P1020 CPU functions with all chassis, power supplies and I/O modules that are current in the MicroNet Plus product line. The 5466-1520 version features Secure Applications. This is currently the top line CPU available for the MicroNet Plus platform and we anticipate it's sale

Transceiver modules 5466-353, 5466-354, 5466-355 (Used with CPU040 & CPU060 modules) were introduced with the CPU040 CPU module in 1997 and used for main chassis to expansion chassis communications. These modules were replaced with the Real Time Network (RTN) module that is compatible with the CPU5200 CPU module in February, 2010. These modules are no longer available as new purchases, however they are repairable as component availability allows. Optionally customers can upgrade either their MicroNetTMR or 5009 controllers to utilize Woodward's CPU5200 and RTN modules as desired. Refer to Woodward PCN# 06919 for more information on replacement and upgrade options.

Input / Output & Communication Modules

MicroNet systems utilize many of the same I/O modules as its predecessor, the NetCon, as well as developing some newer, higher density modules. In general, I/O modules are still supported unless they are listed below.

Displaced I/O Modules
- Actuator Driver modules 5464-646, 6464-647, 5466-235, and 5466-435 were inactivated in July 2001 and are no longer available for new or spare module applications. Repairs are being supported as components allows.

- 4 Channel Actuator Driver modules 5463-877, 5464-027, 5464-035, 5464-544, 5464-545, 5464-546, 5464-655, 5464-656, and 5464-657 were inactivated on March 31, 2015 and are no longer available for new or spare module applications. Repairs are being supported as availability of components allows. Refer to Woodward PCN# 06924 for more information on replacement and upgrade options.

- Integrating Actuator Driver modules 5463-788, 5463-870, 5464-034, 5464-209, 5464-210, 5464-211, 5464-212, 5464-420, 5464-421, 5464-422, 5464-423, 5464-548, 5464-549, 5464-550, 5464-551, 5464-552, 5464-553, 5464-554, 5464-555, 5464-556, 5464-644, 5464-645, 5466-019, and 5466-020 are inactive and no longer available. Repairs are being supported as availability of components allows. Refer to Woodward PCN# 06925 for more information on replacement and upgrade options.

- SIO Modules 5503-267 – This module is still available to purchase as a spare module. Optionally customers can upgrade their MicroNetTMR or 5009 controllers to utilize Woodward's CPU5200-compatible SIO modules (5466-348 or 5501-471).

- Ethernet modules 5464-579, 5464-585, 5464-284, 5466-401, 5466-416, and 5466-456 were inactivated in July 2005 and are no longer available for new or spare module applications. Repairs are being supported as component availability allows.

- Fiber Optic Transceiver modules 5463-715 and 5466-269ic were inactivated in July 2001 and are no longer available for new or spare module applications. Repairs are being supported as components allows.

- Discrete I/O module 5464-881 was inactivated in July 2005 and is no longer available for new or spare module applications. Repairs are being supported as components allows.

- Analog I/O modules 5466-006 and 5466-423 were inactivated in July 2005 and are no longer available for new or spare module applications. Repairs are being supported as components allows.

- HD Analog I/O modules (HDA) 5466-257, 5466-315, 5466-332, 5466-425 and 5503-904. These modules were replaced for 5200 and P1020 CPU systems in late 2015 with new Smart-Plus HDAIO modules 5466-5025, 5466-5026 and 5466-5027. The HDA modules are inactive and are no longer available for new installations or spare parts. Repairs will be supported as availability of components allows. For NT and 040 CPU systems, use 5466-4257. Refer to Woodward PCN# 06931 for more information on replacement and upgrade options.

- Analog Input modules (RTD, TC, Milliamp, Voltage) 5464-332, 5464-333, 5464-334, 5464-335, 5464-336, 5464-337, 5464-338, 5464-339, 5464-340, 5464-660, 5464-837, 5466-282, 5466-400, 5466-1005, 5466-1006, 5466-1007, 5466-1008, 5466-1009, 5466-1010, 5466-1011, 5466-1013, 5466-1014, 5466-1015, 5466-1016, 5466-1017, 5466-1018, 5466-1019, 5503-263, and 5503-264 are inactive and no longer be available for new or spare module applications. Repairs are being supported as availability of components allows. Refer to Woodward PCN# 06928 for more information on replacement and upgrade options.

- High Density Versatile Input Module (HDVIM) module 5503-279 and associated FTM module 5503-282 are inactive and no longer available for new or spare module applications. Repairs are being supported as availability of components allows. This can be replaced with combinations of other modules as desired including HDAnalog, HDCombo, Dataforth or RTCnet/LinkNet HT. Refer to Woodward PCN# 06921 for more information on replacement and upgrade options.

- 8 Channel Analog Out modules 5463-786, 5463-789, 5464-648, and 5464-652 are inactive and no longer available for new or spare module applications. Repairs are being supported as availability of components allows. Refer to Woodward PCN# 06927 for more information on replacement and upgrade options.

- Position Controller modules 5466-030, 5466-344, 5466-345, 5501-461, and 5501-462 are inactive no longer available for new or spare module applications. Repairs are being supported as availability of components allows. Refer to Woodward PCN# 06926 for more information on replacement and upgrade options.

- HDD modules 5466-256 and 5466-258 are inactive no longer available for new or spare module applications. Repairs are being supported as availability of components allows. For 5200 and P1020 CPU systems, these modules have been replaced by the new HDDIO modules 5466-1156 and 5466-1158. For NT or 040 systems, the HDD modules are replaced by 5466-4256 and 5466-4258. Refer to Woodward PCN# 06920 for more information on replacement and upgrade options.

- 4 Channel Digital Speed Sensor modules 5463-787, 5464-015, 5464-414, 5464-658, 5464-659, 5464-834, 5464-844, 5464-850, 5466-404, 5466-405 are inactive and cannot be built for new systems or spares. For 5200 and P1020 systems these speed modules have been replaced by 5466-5000, 5466-5001, 5466-5002, 5466-5003. Please see PCN #06930 for more information.

- HDCombo modules 5466-253 and 5466-316 have been replaced by the new 5466-1115 (standard accuracy) and 5466-1105 (high accuracy) Combo modules. The new modules have 12 AI, 4 AO/Actuators (4-20mA) and 4 Speed inputs. The old modules remain available for spares and systems expansions. Pentium/NT and 040 CPU users should continue to order the 4566-253 and 5466-315 for spares or expansions. See PCN 06933 for further information.