

Microsemi Corporation

October 5, 2019

Customer Notification No: CN19024

Change Classification: Minor

Subject

Libero 12.2 Timing and P&R Changes

CN19024.1 PolarFire 1.0V Production Timing

Description of Change

Minor changes have been made to the timing parameters of sequential elements and select routing resources, including a tightening of the clock skew. These changes result in a minor impact on timing margins of existing designs.

Reason for Change

Our ongoing QA process highlighted the need to reclaim built-in timing margins to bring the timing model to the required quality levels.

Application Impact

Regression tests on the engineering suite of PolarFire designs impacted under this notification (MPF100T/200T/300T 1.0V) show the following:

- Designs created with previous Libero releases and opened without re-running P&R will show a clock performance variation by an average of -0.5% for the dash-1 speed grade and -4% for the -STD speed grade.
- Designs placed and routed in 12.2 will see on average no change in performance compared to the previous release.
- Hold violations vary by a maximum of ± 7 picoseconds compared to previous releases, with no change in the number of these violations.

Action Required

For -1 speed grade designs completed with Libero 12.1 or earlier on MPF100T/200T/300T 1.0V devices:

- The application impact remains within the built-in margin included between models and silicon performance. A design created with Libero SoC v12.1 that has been thoroughly proven on silicon (over PVT) will continue to work.

For -STD speed grade designs completed with Libero 12.1 or earlier on MPF100T/200T/300T 1.0V devices:

- Users are required to re-run STA using Libero 12.2 to check for timing violations. These, if present, can be addressed using general timing closure techniques, including re-running P&R.

Products Affected

See [Appendix A \(see page 3\)](#) for affected part numbers.

CN19024.2 SmartFusion2 and IGLOO2 Place and Route Model Update

Description of Change

Certain Row Global Buffer (RGB) configurations used in the case of routed clocks spanning large areas in SmartFusion2 and IGLOO2 designs have been disabled as of Libero SoC v12.2 onward.

Reason for Change

Prior to Libero SoC v12.2, SmartFusion2 and IGLOO2 designs using clocks routed towards the global network through an RCLKINT macro may require the cascading of multiple Row Global Buffers (RGBs) if the loads on that clock cover a large area in the device. In this case, the clock skew between distant FFs may be larger than the span of what is expected in a local area. In extreme cases (large device, short data path, or distant FFs), a skew-induced timing violation can exist that is undetected by the tools. Libero SoC v12.2 includes an update to the place and route algorithms to prevent such cascading.

Application Impact

The exposure to this issue is limited to designs using the larger devices, M2S150 and M2GL150. To achieve a consistent place and route algorithm that spans all devices the change has been implemented for all dies irrespective of size.

Action Required

If your design uses the affected RGB configurations, you will not be able to generate a programming file using this release.

Impacted designs completed with Libero SoC v12.1, 11.9SP4, or earlier releases will show the following error message when attempting to generate the bitstream of the design using release v12.2:

Error: The action you are requesting cannot be completed. You are using a configuration that has been disabled as of Libero SoC v12.2 onward. Please check the "RGB Area Coverage Limitation" sub-section under the "Known Issues and Limitations" section of Libero SoC v12.2 Release Notes for options to execute the requested action.

User action is required if:

- The impacted design is implemented on the M2S150 or M2GL150 device. In this case, users need to re-run P&R in incremental mode. Designs under this category that are already in production can contact <https://soc.microsemi.com/Portal/Default.aspx> to request a script that can assess the design exposure by analyzing routed clock skew details with respect to the available timing margin.
- The impacted design is not implemented on the M2S150 or the M2GL150 device, and a new bitstream is required using Libero SoC v12.2. In this case, users need to re-run P&R in incremental mode prior to generating the bitstream or regenerate the bitstream using a prior release. Designs in production are not affected.

Products Affected

See [Appendix B \(see page 4\)](#) for affected part numbers.

Contact Information

If you have further questions about this subject, contact Microsemi Technical Support department by using the support portal at <https://soc.microsemi.com/Portal/Default.aspx>

Regards,

Microsemi Corporation

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Appendix A

| | | |
|--------------------|-------------------|--------------------|
| MPF100T-FCG484E | MPF100TL-FCG484E | MPF100T-1FCG484E |
| MPF100T-FCVG484E | MPF100TL-FCVG484E | MPF100T-1FCVG484E |
| MPF100T-FCSG325E | MPF100TL-FCSG325E | MPF100T-1FCSG325E |
| MPF200T-FCG484E | MPF200TL-FCG484E | MPF200T-1FCG484E |
| MPF200T-FCVG484E | MPF200TL-FCVG484E | MPF200T-1FCVG484E |
| MPF200T-FCG784E | MPF200TL-FCG784E | MPF200T-1FCG784E |
| MPF200T-FCSG325E | MPF200TL-FCSG325E | MPF200T-1FCSG325E |
| MPF200T-FCSG536E | MPF200TL-FCSG536E | MPF200T-1FCSG536E |
| MPF300T-FCG484E | MPF300TL-FCG484E | MPF300T-1FCG484E |
| MPF300T-FCVG484E | MPF300TL-FCVG484E | MPF300T-1FCVG484E |
| MPF300T-FCG784E | MPF300TL-FCG784E | MPF300T-1FCG784E |
| MPF300T-FCSG536E | MPF300TL-FCSG536E | MPF300T-1FCSG536E |
| MPF300T-FCG1152E | MPF300TL-FCG1152E | MPF300T-1FCG1152E |
| MPF100T-FCG484I | MPF100TL-FCG484I | MPF100T-1FCG484I |
| MPF100T-FCVG484I | MPF100TL-FCVG484I | MPF100T-1FCVG484I |
| MPF100T-FCSG325I | MPF100TL-FCSG325I | MPF100T-1FCSG325I |
| MPF200T-FCG484I | MPF200TL-FCG484I | MPF200T-1FCG484I |
| MPF200T-FCVG484I | MPF200TL-FCVG484I | MPF200T-1FCVG484I |
| MPF200T-FCG784I | MPF200TL-FCG784I | MPF200T-1FCG784I |
| MPF200T-FCSG325I | MPF200TL-FCSG325I | MPF200T-1FCSG325I |
| MPF200T-FCSG536I | MPF200TL-FCSG536I | MPF200T-1FCSG536I |
| MPF300T-FCG484I | MPF300TL-FCG484I | MPF300T-1FCG484I |
| MPF300T-FCVG484I | MPF300TL-FCVG484I | MPF300T-1FCVG484I |
| MPF300T-FCG784I | MPF300TL-FCG784I | MPF300T-1FCG784I |
| MPF300T-FCSG536I | MPF300TL-FCSG536I | MPF300T-1FCSG536I |
| MPF300T-FCG1152I | MPF300TL-FCG1152I | MPF300T-1FCG1152I |
| MPF100TLS-FCG484I | MPF100TS-FCG484I | MPF100TS-1FCG484I |
| MPF100TLS-FCVG484I | MPF100TS-FCVG484I | MPF100TS-1FCVG484I |
| MPF100TLS-FCSG325I | MPF100TS-FCSG325I | MPF100TS-1FCSG325I |
| MPF200TLS-FCG484I | MPF200TS-FCG484I | MPF200TS-1FCG484I |
| MPF200TLS-FCVG484I | MPF200TS-FCVG484I | MPF200TS-1FCVG484I |
| MPF200TLS-FCG784I | MPF200TS-FCG784I | MPF200TS-1FCG784I |
| MPF200TLS-FCSG325I | MPF200TS-FCSG325I | MPF200TS-1FCSG325I |
| MPF200TLS-FCSG536I | MPF200TS-FCSG536I | MPF200TS-1FCSG536I |
| MPF300TLS-FCG484I | MPF300TS-FCG484I | MPF300TS-1FCG484I |
| MPF300TLS-FCVG484I | MPF300TS-FCVG484I | MPF300TS-1FCVG484I |
| MPF300TLS-FCG784I | MPF300TS-FCG784I | MPF300TS-1FCG784I |
| MPF300TLS-FCSG536I | MPF300TS-FCSG536I | MPF300TS-1FCSG536I |
| MPF300TLS-FCG1152I | MPF300TS-FCG1152I | MPF300TS-1FCG1152I |

Appendix B

| | | | | | |
|-------------------|-----------------|--------------------|------------------|--------------------|------------------|
| M2S005-1FG484 | M2S005S-VF400 | M2S010T-1FGG484 | M2S010T-VF400 | M2S025T-1VF400 | M2S025TS-VFG400I |
| M2S005-1FG484I | M2S005S-VF400I | M2S010T-1FGG484I | M2S010T-VF400I | M2S025T-1VF400I | M2S025T-VF256 |
| M2S005-1FGG484 | M2S005S-VFG256 | M2S010T-1FGG484M | M2S010T-VFG256 | M2S025T-1VFG256 | M2S025T-VF256I |
| M2S005-1FGG484I | M2S005S-VFG256I | M2S010T-1VF256 | M2S010T-VFG256I | M2S025T-1VFG256I | M2S025T-VF400 |
| M2S005-1TQ144 | M2S005S-VFG400 | M2S010T-1VF256I | M2S010T-VFG400 | M2S025T-1VFG400 | M2S025T-VF400I |
| M2S005-1TQ144I | M2S005S-VFG400I | M2S010T-1VF400 | M2S010T-VFG400I | M2S025T-1VFG400I | M2S025T-VFG256 |
| M2S005-1TQG144 | M2S005-TQ144 | M2S010T-1VF400I | M2S010-VF256 | M2S025T-FCS325 | M2S025T-VFG256I |
| M2S005-1TQG144I | M2S005-TQ144I | M2S010T-1VFG256 | M2S010-VF256I | M2S025T-FCS325I | M2S025T-VFG400 |
| M2S005-1VF256 | M2S005-TQG144 | M2S010T-1VFG256I | M2S010-VF400 | M2S025T-FCSG325 | M2S025T-VFG400I |
| M2S005-1VF256I | M2S005-TQG144I | M2S010T-1VFG400 | M2S010-VF400I | M2S025T-FCSG325I | M2S025-VF256 |
| M2S005-1VF400 | M2S005-VF256 | M2S010T-1VFG400I | M2S010-VFG256 | M2S025T-FG484 | M2S025-VF256I |
| M2S005-1VF400I | M2S005-VF256I | M2S010T-FG484 | M2S010-VFG256I | M2S025T-FG484I | M2S025-VF400 |
| M2S005-1VFG256 | M2S005-VF400 | M2S010T-FG484I | M2S010-VFG400 | M2S025T-FGG484 | M2S025-VF400I |
| M2S005-1VFG256I | M2S005-VF400I | M2S010T-FGG484 | M2S010-VFG400I | M2S025T-FGG484I | M2S025-VFG256 |
| M2S005-1VFG400 | M2S005-VFG256 | M2S010T-FGG484I | M2S025-1FCS325 | M2S025TS-1FCS325 | M2S025-VFG256I |
| M2S005-1VFG400I | M2S005-VFG256I | M2S010-TQ144 | M2S025-1FCS325I | M2S025TS-1FCS325I | M2S025-VFG400 |
| M2S005-FG484 | M2S005-VFG400 | M2S010-TQ144I | M2S025-1FCSG325 | M2S025TS-1FCSG325 | M2S025-VFG400I |
| M2S005-FG484I | M2S005-VFG400I | M2S010-TQG144 | M2S025-1FCSG325I | M2S025TS-1FCSG325I | M2S050-1FCS325 |
| M2S005-FGG484 | M2S010-1FG484 | M2S010-TQG144I | M2S025-1FG484 | M2S025TS-1FG484 | M2S050-1FCS325I |
| M2S005-FGG484I | M2S010-1FG484I | M2S010TS-1FG484 | M2S025-1FG484I | M2S025TS-1FG484I | M2S050-1FCSG325 |
| M2S005S-1FG484 | M2S010-1FGG484 | M2S010TS-1FG484I | M2S025-1FGG484 | M2S025TS-1FG484M | M2S050-1FCSG325I |
| M2S005S-1FG484I | M2S010-1FGG484I | M2S010TS-1FG484M | M2S025-1FGG484I | M2S025TS-1FGG484 | M2S050-1FG484 |
| M2S005S-1FGG484 | M2S010-1TQ144 | M2S010TS-1FGG484 | M2S025-1VF256 | M2S025TS-1FGG484I | M2S050-1FG484I |
| M2S005S-1FGG484I | M2S010-1TQ144I | M2S010TS-1FGG484I | M2S025-1VF256I | M2S025TS-1FGG484M | M2S050-1FG896 |
| M2S005S-1FGG484T2 | M2S010-1TQG144 | M2S010TS-1FGG484M | M2S025-1VF400 | M2S025TS-1FGG484T2 | M2S050-1FG896I |
| M2S005S-1TQ144 | M2S010-1TQG144I | M2S010TS-1FGG484T2 | M2S025-1VF400I | M2S025TS-1VF256 | M2S050-1FGG484 |
| M2S005S-1TQ144I | M2S010-1VF256 | M2S010TS-1VF256 | M2S025-1VFG256 | M2S025TS-1VF256I | M2S050-1FGG484I |
| M2S005S-1TQG144 | M2S010-1VF256I | M2S010TS-1VF256I | M2S025-1VFG256I | M2S025TS-1VF400 | M2S050-1FGG896 |
| M2S005S-1TQG144I | M2S010-1VF400 | M2S010TS-1VF400 | M2S025-1VFG400 | M2S025TS-1VF400I | M2S050-1FGG896I |
| M2S005S-1TQG144T2 | M2S010-1VF400I | M2S010TS-1VF400I | M2S025-1VFG400I | M2S025TS-1VFG256 | M2S050-1VF400 |
| M2S005S-1VF256 | M2S010-1VFG256 | M2S010TS-1VFG256 | M2S025-FCS325 | M2S025TS-1VFG256I | M2S050-1VF400I |
| M2S005S-1VF256I | M2S010-1VFG256I | M2S010TS-1VFG256I | M2S025-FCS325I | M2S025TS-1VFG256T2 | M2S050-1VFG400 |

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|-------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
| M2S005S-1VF400 | M2S010-1VFG400 | M2S010TS-1VFG256T2 | M2S025-FCSG325 | M2S025TS-1VFG400 | M2S050-1VFG400I |
| M2S005S-1VF400I | M2S010-1VFG400I | M2S010TS-1VFG400 | M2S025-FCSG325I | M2S025TS-1VFG400I | M2S050-FCS325 |
| M2S005S-1VFG256 | M2S010-FG484 | M2S010TS-1VFG400I | M2S025-FG484 | M2S025TS-1VFG400T2 | M2S050-FCS325I |
| M2S005S-1VFG256I | M2S010-FG484I | M2S010TS-1VFG400T2 | M2S025-FG484I | M2S025TS-FCS325 | M2S050-FCSG325 |
| M2S005S-1VFG256T2 | M2S010-FGG484 | M2S010TS-FG484 | M2S025-FGG484 | M2S025TS-FCS325I | M2S050-FCSG325I |
| M2S005S-1VFG400 | M2S010-FGG484I | M2S010TS-FG484I | M2S025-FGG484I | M2S025TS-FCSG325 | M2S050-FG484 |
| M2S005S-1VFG400I | M2S010S-1TQ144 | M2S010TS-FGG484 | M2S025T-1FCS325 | M2S025TS-FCSG325I | M2S050-FG484I |
| M2S005S-1VFG400T2 | M2S010S-1TQ144I | M2S010TS-FGG484I | M2S025T-1FCS325I | M2S025TS-FG484 | M2S050-FG896 |
| M2S005S-FG484 | M2S010S-1TQG144 | M2S010TS-VF256 | M2S025T-1FCSG325 | M2S025TS-FG484I | M2S050-FG896I |
| M2S005S-FG484I | M2S010S-1TQG144I | M2S010TS-VF256I | M2S025T-1FCSG325I | M2S025TS-FGG484 | M2S050-FGG484 |
| M2S005S-FGG484 | M2S010S-1TQG144T2 | M2S010TS-VF400 | M2S025T-1FG484 | M2S025TS-FGG484I | M2S050-FGG484I |
| M2S005S-FGG484I | M2S010S-TQ144 | M2S010TS-VF400I | M2S025T-1FG484I | M2S025TS-VF256 | M2S050-FGG896 |
| M2S005S-TQ144 | M2S010S-TQ144I | M2S010TS-VFG256 | M2S025T-1FG484M | M2S025TS-VF256I | M2S050-FGG896I |
| M2S005S-TQ144I | M2S010S-TQG144 | M2S010TS-VFG256I | M2S025T-1FGG484 | M2S025TS-VF400 | M2S050T-1FCS325 |
| M2S005S-TQG144 | M2S010S-TQG144I | M2S010TS-VFG400 | M2S025T-1FGG484I | M2S025TS-VF400I | M2S050T-1FCS325I |
| M2S005S-TQG144I | M2S010T-1FG484 | M2S010TS-VFG400I | M2S025T-1FGG484M | M2S025TS-VFG256 | M2S050T-1FCSG325 |
| M2S005S-VF256 | M2S010T-1FG484I | M2S010T-VF256 | M2S025T-1VF256 | M2S025TS-VFG256I | M2S050T-1FCSG325I |
| M2S005S-VF256I | M2S010T-1FG484M | M2S010T-VF256I | M2S025T-1VF256I | M2S025TS-VFG400 | M2S050T-1FG484 |
| M2S050T-1FG484I | M2S050TS-FGG896 | M2S060T-1FGG484M | M2S060TS-VF400I | M2S090T-FG484 | M2S150-FCG1152I |
| M2S050T-1FG484M | M2S050TS-FGG896I | M2S060T-1FGG676 | M2S060TS-VFG400 | M2S090T-FG484I | M2S150-FCS536 |
| M2S050T-1FG896 | M2S050TS-VF400 | M2S060T-1FGG676I | M2S060TS-VFG400I | M2S090T-FG676 | M2S150-FCS536I |
| M2S050T-1FG896I | M2S050TS-VF400I | M2S060T-1VF400 | M2S060T-VF400 | M2S090T-FG676I | M2S150-FCSG536 |
| M2S050T-1FGG484 | M2S050TS-VFG400 | M2S060T-1VF400I | M2S060T-VF400I | M2S090T-FGG484 | M2S150-FCSG536I |
| M2S050T-1FGG484I | M2S050TS-VFG400I | M2S060T-1VFG400 | M2S060T-VFG400 | M2S090T-FGG484I | M2S150-FCV484 |
| M2S050T-1FGG484M | M2S050T-VF400 | M2S060T-1VFG400I | M2S060T-VFG400I | M2S090T-FGG676 | M2S150-FCV484I |
| M2S050T-1FGG896 | M2S050T-VF400I | M2S060T-FCS325 | M2S060-VF400 | M2S090T-FGG676I | M2S150-FCVG484 |
| M2S050T-1FGG896I | M2S050T-VFG400 | M2S060T-FCS325I | M2S060-VF400I | M2S090TS-1FCS325 | M2S150-FCVG484I |
| M2S050T-1VF400 | M2S050T-VFG400I | M2S060T-FCSG325 | M2S060-VFG400 | M2S090TS-1FCS325I | M2S150T-1FC1152 |
| M2S050T-1VF400I | M2S050-VF400 | M2S060T-FCSG325I | M2S060-VFG400I | M2S090TS-1FCSG325 | M2S150T-1FC1152I |
| M2S050T-1VFG400 | M2S050-VF400I | M2S060T-FG484 | M2S090-1FCS325 | M2S090TS-1FCSG325I | M2S150T-1FC1152M |
| M2S050T-1VFG400I | M2S050-VFG400 | M2S060T-FG484I | M2S090-1FCS325I | M2S090TS-1FG484 | M2S150T-1FCG1152 |
| M2S050T-FCS325 | M2S050-VFG400I | M2S060T-FG676 | M2S090-1FCSG325 | M2S090TS-1FG484I | M2S150T-1FCG1152I |

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|--------------------|------------------|--------------------|-------------------|--------------------|--------------------|
| M2S050T-FCS325I | M2S060-1FCS325 | M2S060T-FG676I | M2S090-1FCSG325I | M2S090TS-1FG484M | M2S150T-1FCG1152M |
| M2S050T-FCSG325 | M2S060-1FCS325I | M2S060T-FGG484 | M2S090-1FG484 | M2S090TS-1FG676 | M2S150T-1FCS536 |
| M2S050T-FCSG325I | M2S060-1FCSG325 | M2S060T-FGG484I | M2S090-1FG484I | M2S090TS-1FG676I | M2S150T-1FCS536I |
| M2S050T-FG484 | M2S060-1FCSG325I | M2S060T-FGG676 | M2S090-1FG676 | M2S090TS-1FGG484 | M2S150T-1FCSG536 |
| M2S050T-FG484I | M2S060-1FG484 | M2S060T-FGG676I | M2S090-1FG676I | M2S090TS-1FGG484I | M2S150T-1FCSG536I |
| M2S050T-FG896 | M2S060-1FG484I | M2S060TS-1FCS325 | M2S090-1FGG484 | M2S090TS-1FGG484M | M2S150T-1FCV484 |
| M2S050T-FG896I | M2S060-1FG676 | M2S060TS-1FCS325I | M2S090-1FGG484I | M2S090TS-1FGG484T2 | M2S150T-1FCV484I |
| M2S050T-FGG484 | M2S060-1FG676I | M2S060TS-1FCSG325 | M2S090-1FGG676 | M2S090TS-1FGG676 | M2S150T-1FCV484M |
| M2S050T-FGG484I | M2S060-1FGG484 | M2S060TS-1FCSG325I | M2S090-1FGG676I | M2S090TS-1FGG676I | M2S150T-1FCV484 |
| M2S050T-FGG896 | M2S060-1FGG484I | M2S060TS-1FG484 | M2S090-FCS325 | M2S090TS-1FGG676T2 | M2S150T-1FCV484I |
| M2S050T-FGG896I | M2S060-1FGG676 | M2S060TS-1FG484I | M2S090-FCS325I | M2S090TS-EVAL-KIT | M2S150T-FC1152 |
| M2S050TS-1FCS325 | M2S060-1FGG676I | M2S060TS-1FG484M | M2S090-FCSG325 | M2S090TS-FCS325 | M2S150T-FC1152I |
| M2S050TS-1FCS325I | M2S060-1VF400 | M2S060TS-1FG676 | M2S090-FCSG325I | M2S090TS-FCS325I | M2S150T-FCG1152 |
| M2S050TS-1FCSG325 | M2S060-1VF400I | M2S060TS-1FG676I | M2S090-FG484 | M2S090TS-FCSG325 | M2S150T-FCG1152I |
| M2S050TS-1FCSG325I | M2S060-1VFG400 | M2S060TS-1FGG484 | M2S090-FG484I | M2S090TS-FCSG325I | M2S150T-FCS536 |
| M2S050TS-1FG484 | M2S060-1VFG400I | M2S060TS-1FGG484I | M2S090-FG676 | M2S090TS-FG484 | M2S150T-FCS536I |
| M2S050TS-1FG484I | M2S060-FCS325 | M2S060TS-1FGG484M | M2S090-FG676I | M2S090TS-FG484I | M2S150T-FCSG536 |
| M2S050TS-1FG484M | M2S060-FCS325I | M2S060TS-1FGG484T2 | M2S090-FGG484 | M2S090TS-FG676 | M2S150T-FCSG536I |
| M2S050TS-1FG896 | M2S060-FCSG325 | M2S060TS-1FGG676 | M2S090-FGG484I | M2S090TS-FG676I | M2S150T-FCV484 |
| M2S050TS-1FG896I | M2S060-FCSG325I | M2S060TS-1FGG676I | M2S090-FGG676 | M2S090TS-FGG484 | M2S150T-FCV484I |
| M2S050TS-1FGG484 | M2S060-FG484 | M2S060TS-1FGG676T2 | M2S090-FGG676I | M2S090TS-FGG484I | M2S150T-FCV484 |
| M2S050TS-1FGG484I | M2S060-FG484I | M2S060TS-1VF400 | M2S090T-1FCS325 | M2S090TS-FGG676 | M2S150T-FCV484I |
| M2S050TS-1FGG484M | M2S060-FG676 | M2S060TS-1VF400I | M2S090T-1FCS325I | M2S090TS-FGG676I | M2S150TS-1FC1152 |
| M2S050TS-1FGG896 | M2S060-FG676I | M2S060TS-1VFG400 | M2S090T-1FCSG325 | M2S150-1FC1152 | M2S150TS-1FC1152I |
| M2S050TS-1FGG896I | M2S060-FGG484 | M2S060TS-1VFG400I | M2S090T-1FCSG325I | M2S150-1FC1152I | M2S150TS-1FC1152M |
| M2S050TS-1VF400 | M2S060-FGG484I | M2S060TS-1VFG400T2 | M2S090T-1FG484 | M2S150-1FCG1152 | M2S150TS-1FCG1152 |
| M2S050TS-1VF400I | M2S060-FGG676 | M2S060TS-FCS325 | M2S090T-1FG484I | M2S150-1FCG1152I | M2S150TS-1FCG1152I |
| M2S050TS-1VFG400 | M2S060-FGG676I | M2S060TS-FCS325I | M2S090T-1FG484M | M2S150-1FCS536 | M2S150TS-1FCG1152M |
| M2S050TS-1VFG400I | M2S060T-1FCS325 | M2S060TS-FCSG325 | M2S090T-1FG676 | M2S150-1FCS536I | M2S150TS-1FCS536 |
| M2S050TS-FCS325 | M2S060T-1FCS325I | M2S060TS-FCSG325I | M2S090T-1FG676I | M2S150-1FCSG536 | M2S150TS-1FCS536I |

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| M2S050TS-FCS325I | M2S060T-1FCSG325 | M2S060TS-FG484 | M2S090T-1FGG484 | M2S150-1FCSG536I | M2S150TS-1FCSG536 |
| M2S050TS-FCSG325 | M2S060T-1FCSG325I | M2S060TS-FG484I | M2S090T-1FGG484I | M2S150-1FCV484 | M2S150TS-1FCSG536I |
| M2S050TS-FCSG325I | M2S060T-1FG484 | M2S060TS-FG676 | M2S090T-1FGG484M | M2S150-1FCV484I | M2S150TS-1FCV484 |
| M2S050TS-FG484 | M2S060T-1FG484I | M2S060TS-FG676I | M2S090T-1FGG676 | M2S150-1FCVG484 | M2S150TS-1FCV484I |
| M2S050TS-FG484I | M2S060T-1FG484M | M2S060TS-FGG484 | M2S090T-1FGG676I | M2S150-1FCVG484I | M2S150TS-1FCV484M |
| M2S050TS-FG896 | M2S060T-1FG676 | M2S060TS-FGG484I | M2S090T-FCS325 | M2S150-ADV-DEV-KIT | M2S150TS-1FCVG484 |
| M2S050TS-FG896I | M2S060T-1FG676I | M2S060TS-FGG676 | M2S090T-FCS325I | M2S150-FC1152 | M2S150TS-1FCVG484I |
| M2S050TS-FGG484 | M2S060T-1FGG484 | M2S060TS-FGG676I | M2S090T-FCSG325 | M2S150-FC1152I | M2S150TS-FC1152 |
| M2S050TS-FGG484I | M2S060T-1FGG484I | M2S060TS-VF400 | M2S090T-FCSG325I | M2S150-FCG1152 | M2S150TS-FC1152I |
| M2S150TS-FCG1152 | M2S150TS-FCG1152I | M2S150TS-FCS536 | M2S150TS-FCS536I | M2S150TS-FCSG536 | M2S150TS-FCSG536I |
| M2S150TS-FCV484 | M2S150TS-FCV484I | M2S150TS-FCVG484 | M2S150TS-FCVG484I | | |
| M2GL005-1FG484 | M2GL010T-1FG484I | M2GL025T-1FGG484M | M2GL050T-1FCSG325 | M2GL060T-1FCS325I | |
| M2GL005-1FG484I | M2GL010T-1FG484M | M2GL025T-1VF256 | M2GL050T-1FCSG325I | M2GL060T-1FCSG325 | |
| M2GL005-1FGG484 | M2GL010T-1FGG484 | M2GL025T-1VF256I | M2GL050T-1FG484 | M2GL060T-1FCSG325I | |
| M2GL005-1FGG484I | M2GL010T-1FGG484I | M2GL025T-1VF400 | M2GL050T-1FG484I | M2GL060T-1FG484 | |
| M2GL005-1FGG484T1 | M2GL010T-1FGG484M | M2GL025T-1VF400I | M2GL050T-1FG484M | M2GL060T-1FG484I | |
| M2GL005-1TQ144 | M2GL010T-1VF256 | M2GL025T-1VFG256 | M2GL050T-1FG896 | M2GL060T-1FG484M | |
| M2GL005-1TQ144I | M2GL010T-1VF256I | M2GL025T-1VFG256I | M2GL050T-1FG896I | M2GL060T-1FG676 | |
| M2GL005-1TQG144 | M2GL010T-1VF400 | M2GL025T-1VFG400 | M2GL050T-1FGG484 | M2GL060T-1FG676I | |
| M2GL005-1TQG144I | M2GL010T-1VF400I | M2GL025T-1VFG400I | M2GL050T-1FGG484I | M2GL060T-1FGG484 | |
| M2GL005-1VF256 | M2GL010T-1VFG256 | M2GL025T-FCS325 | M2GL050T-1FGG484M | M2GL060T-1FGG484I | |
| M2GL005-1VF256I | M2GL010T-1VFG256I | M2GL025T-FCS325I | M2GL050T-1FGG896 | M2GL060T-1FGG484M | |
| M2GL005-1VF400 | M2GL010T-1VFG400 | M2GL025T-FCSG325 | M2GL050T-1FGG896I | M2GL060T-1FGG676 | |
| M2GL005-1VF400I | M2GL010T-1VFG400I | M2GL025T-FCSG325I | M2GL050T-1VF400 | M2GL060T-1FGG676I | |
| M2GL005-1VFG256 | M2GL010T-FG484 | M2GL025T-FG484 | M2GL050T-1VF400I | M2GL060T-1VF400 | |
| M2GL005-1VFG256I | M2GL010T-FG484I | M2GL025T-FG484I | M2GL050T-1VFG400 | M2GL060T-1VF400I | |
| M2GL005-1VFG400 | M2GL010T-FGG484 | M2GL025T-FGG484 | M2GL050T-1VFG400I | M2GL060T-1VFG400 | |
| M2GL005-1VFG400I | M2GL010T-FGG484I | M2GL025T-FGG484I | M2GL050T-FCS325 | M2GL060T-1VFG400I | |
| M2GL005-FG484 | M2GL010-TQ144 | M2GL025TS-1FCS325 | M2GL050T-FCS325I | M2GL060T-FCS325 | |
| M2GL005-FG484I | M2GL010-TQ144I | M2GL025TS-1FCS325I | M2GL050T-FCSG325 | M2GL060T-FCS325I | |
| M2GL005-FGG484 | M2GL010-TQG144 | M2GL025TS-1FCSG325 | M2GL050T-FCSG325I | M2GL060T-FCSG325 | |
| M2GL005-FGG484I | M2GL010-TQG144I | M2GL025TS-1FCSG325I | M2GL050T-FG484 | M2GL060T-FCSG325I | |
| M2GL005S-1FG484 | M2GL010TS-1FG484 | M2GL025TS-1FG484 | M2GL050T-FG484I | M2GL060T-FG484 | |
| M2GL005S-1FG484I | M2GL010TS-1FG484I | M2GL025TS-1FG484I | M2GL050T-FG896 | M2GL060T-FG484I | |
| M2GL005S-1FGG484 | M2GL010TS-1FG484M | M2GL025TS-1FG484M | M2GL050T-FG896I | M2GL060T-FG676 | |

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| M2GL005S-1FGG484I | M2GL010TS-1FGG484 | M2GL025TS-1FGG484 | M2GL050T-FGG484 | M2GL060T-FGG676I |
| M2GL005S-1FGG484T2 | M2GL010TS-1FGG484I | M2GL025TS-1FGG484I | M2GL050T-FGG484I | M2GL060T-FGG484 |
| M2GL005S-1TQ144 | M2GL010TS-1FGG484M | M2GL025TS-1FGG484M | M2GL050T-FGG896 | M2GL060T-FGG484I |
| M2GL005S-1TQ144I | M2GL010TS-1FGG484T2 | M2GL025TS-1FGG484T2 | M2GL050T-FGG896I | M2GL060T-FGG676 |
| M2GL005S-1TQG144 | M2GL010TS-1VF256 | M2GL025TS-1VF256 | M2GL050TS-1FCS325 | M2GL060T-FGG676I |
| M2GL005S-1TQG144I | M2GL010TS-1VF256I | M2GL025TS-1VF256I | M2GL050TS-1FCS325I | M2GL060TS-1FCS325 |
| M2GL005S-1TQG144T2 | M2GL010TS-1VF400 | M2GL025TS-1VF400 | M2GL050TS-1FCSG325 | M2GL060TS-1FCS325I |
| M2GL005S-1VF256 | M2GL010TS-1VF400I | M2GL025TS-1VF400I | M2GL050TS-1FCSG325I | M2GL060TS-1FCSG325 |
| M2GL005S-1VF256I | M2GL010TS-1VFG256 | M2GL025TS-1VFG256 | M2GL050TS-1FG484 | M2GL060TS-1FCSG325I |
| M2GL005S-1VF400 | M2GL010TS-1VFG256I | M2GL025TS-1VFG256I | M2GL050TS-1FG484I | M2GL060TS-1FG484 |
| M2GL005S-1VF400I | M2GL010TS-1VFG256T2 | M2GL025TS-1VFG256T2 | M2GL050TS-1FG484M | M2GL060TS-1FG484I |
| M2GL005S-1VFG256 | M2GL010TS-1VFG400 | M2GL025TS-1VFG400 | M2GL050TS-1FG896 | M2GL060TS-1FG484M |
| M2GL005S-1VFG256I | M2GL010TS-1VFG400I | M2GL025TS-1VFG400I | M2GL050TS-1FG896I | M2GL060TS-1FG676 |
| M2GL005S-1VFG256T2 | M2GL010TS-1VFG400T2 | M2GL025TS-1VFG400T2 | M2GL050TS-1FGG484 | M2GL060TS-1FG676I |
| M2GL005S-1VFG400 | M2GL010TS-FG484 | M2GL025TS-FCS325 | M2GL050TS-1FGG484I | M2GL060TS-1FGG484 |
| M2GL005S-1VFG400I | M2GL010TS-FG484I | M2GL025TS-FCS325I | M2GL050TS-1FGG484M | M2GL060TS-1FGG484I |
| M2GL005S-1VFG400T2 | M2GL010TS-FGG484 | M2GL025TS-FCSG325 | M2GL050TS-1FGG896 | M2GL060TS-1FGG484M |
| M2GL005S-FG484 | M2GL010TS-FGG484I | M2GL025TS-FCSG325I | M2GL050TS-1FGG896I | M2GL060TS-1FGG484T2 |
| M2GL005S-FG484I | M2GL010TS-VF256 | M2GL025TS-FG484 | M2GL050TS-1VF400 | M2GL060TS-1FGG676 |
| M2GL005S-FGG484 | M2GL010TS-VF256I | M2GL025TS-FG484I | M2GL050TS-1VF400I | M2GL060TS-1FGG676I |
| M2GL005S-FGG484I | M2GL010TS-VF400 | M2GL025TS-FGG484 | M2GL050TS-1VFG400 | M2GL060TS-1FGG676T2 |
| M2GL005S-TQ144 | M2GL010TS-VF400I | M2GL025TS-FGG484I | M2GL050TS-1VFG400I | M2GL060TS-1VF400 |
| M2GL005S-TQ144I | M2GL010TS-VFG256 | M2GL025TS-VF256 | M2GL050TS-FCS325 | M2GL060TS-1VF400I |
| M2GL005S-TQG144 | M2GL010TS-VFG256I | M2GL025TS-VF256I | M2GL050TS-FCS325I | M2GL060TS-1VFG400 |
| M2GL005S-TQG144I | M2GL010TS-VFG400 | M2GL025TS-VF400 | M2GL050TS-FCSG325 | M2GL060TS-1VFG400I |
| M2GL005S-VF256 | M2GL010TS-VFG400I | M2GL025TS-VF400I | M2GL050TS-FCSG325I | M2GL060TS-1VFG400T2 |
| M2GL005S-VF256I | M2GL010T-VF256 | M2GL025TS-VFG256 | M2GL050TS-FG484 | M2GL060TS-FCS325 |
| M2GL005S-VF400 | M2GL010T-VF256I | M2GL025TS-VFG256I | M2GL050TS-FG484I | M2GL060TS-FCS325I |
| M2GL005S-VF400I | M2GL010T-VF400 | M2GL025TS-VFG400 | M2GL050TS-FG896 | M2GL060TS-FCSG325 |
| M2GL005S-VFG256 | M2GL010T-VF400I | M2GL025TS-VFG400I | M2GL050TS-FG896I | M2GL060TS-FCSG325I |
| M2GL005S-VFG256I | M2GL010T-VFG256 | M2GL025T-VF256 | M2GL050TS-FGG484 | M2GL060TS-FG484 |
| M2GL005S-VFG400 | M2GL010T-VFG256I | M2GL025T-VF256I | M2GL050TS-FGG484I | M2GL060TS-FG484I |
| M2GL005S-VFG400I | M2GL010T-VFG400 | M2GL025T-VF400 | M2GL050TS-FGG896 | M2GL060TS-FG676 |
| M2GL005-TQ144 | M2GL010T-VFG400I | M2GL025T-VF400I | M2GL050TS-FGG896I | M2GL060TS-FGG676I |
| M2GL005-TQ144I | M2GL010-VF256 | M2GL025T-VFG256 | M2GL050TS-VF400 | M2GL060TS-FGG484 |
| M2GL005-TQG144 | M2GL010-VF256I | M2GL025T-VFG256I | M2GL050TS-VF400I | M2GL060TS-FGG484I |
| M2GL005-TQG144I | M2GL010-VF400 | M2GL025T-VFG400 | M2GL050TS-VFG400 | M2GL060TS-FGG676 |
| M2GL005-VF256 | M2GL010-VF400I | M2GL025T-VFG400I | M2GL050TS-VFG400I | M2GL060TS-FGG676I |
| M2GL005-VF256I | M2GL010-VFG256 | M2GL025-VF256 | M2GL050T-VF400 | M2GL060TS-VF400 |
| M2GL005-VF400 | M2GL010-VFG256I | M2GL025-VF256I | M2GL050T-VF400I | M2GL060TS-VF400I |
| M2GL005-VF400I | M2GL010-VFG400 | M2GL025-VF400 | M2GL050T-VFG400 | M2GL060TS-VFG400 |

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| M2GL005-VFG256 | M2GL010-VFG400I | M2GL025-VF400I | M2GL050T-VFG400I | M2GL060TS-VFG400I |
| M2GL005-VFG256I | M2GL025-1FCS325 | M2GL025-VFG256 | M2GL050-VF400 | M2GL060T-VF400 |
| M2GL005-VFG400 | M2GL025-1FCS325I | M2GL025-VFG256I | M2GL050-VF400I | M2GL060T-VF400I |
| M2GL005-VFG400I | M2GL025-1FCSG325 | M2GL025-VFG400 | M2GL050-VFG400 | M2GL060T-VFG400 |
| M2GL010-1FG484 | M2GL025-1FCSG325I | M2GL025-VFG400I | M2GL050-VFG400I | M2GL060T-VFG400I |
| M2GL010-1FG484I | M2GL025-1FG484 | M2GL050-1FCS325 | M2GL060-1FCS325 | M2GL060-VF400 |
| M2GL010-1FGG484 | M2GL025-1FG484I | M2GL050-1FCS325I | M2GL060-1FCS325I | M2GL060-VF400I |
| M2GL010-1FGG484I | M2GL025-1FGG484 | M2GL050-1FCSG325 | M2GL060-1FCSG325 | M2GL060-VFG400 |
| M2GL010-1FGG484T1 | M2GL025-1FGG484I | M2GL050-1FCSG325I | M2GL060-1FCSG325I | M2GL060-VFG400I |
| M2GL010-1TQ144 | M2GL025-1FGG484T1 | M2GL050-1FG484 | M2GL060-1FG484 | M2GL090-1FCS325 |
| M2GL010-1TQ144I | M2GL025-1VF256 | M2GL050-1FG484I | M2GL060-1FG484I | M2GL090-1FCS325I |
| M2GL010-1TQG144 | M2GL025-1VF256I | M2GL050-1FG896 | M2GL060-1FG676 | M2GL090-1FCSG325 |
| M2GL010-1TQG144I | M2GL025-1VF400 | M2GL050-1FG896I | M2GL060-1FG676I | M2GL090-1FCSG325I |
| M2GL010-1VF256 | M2GL025-1VF400I | M2GL050-1FGG484 | M2GL060-1FGG484 | M2GL090-1FG484 |
| M2GL010-1VF256I | M2GL025-1VFG256 | M2GL050-1FGG484I | M2GL060-1FGG484I | M2GL090-1FG484I |
| M2GL010-1VF400 | M2GL025-1VFG256I | M2GL050-1FGG896 | M2GL060-1FGG484T1 | M2GL090-1FG676 |
| M2GL010-1VF400I | M2GL025-1VFG400 | M2GL050-1FGG896I | M2GL060-1FGG676 | M2GL090-1FG676I |
| M2GL010-1VFG256 | M2GL025-1VFG400I | M2GL050-1VF400 | M2GL060-1FGG676I | M2GL090-1FGG484 |
| M2GL010-1VFG256I | M2GL025-FCS325 | M2GL050-1VF400I | M2GL060-1VF400 | M2GL090-1FGG484I |
| M2GL010-1VFG400 | M2GL025-FCS325I | M2GL050-1VFG400 | M2GL060-1VF400I | M2GL090-1FGG484T1 |
| M2GL010-1VFG400I | M2GL025-FCSG325 | M2GL050-1VFG400I | M2GL060-1VFG400 | M2GL090-1FGG676 |
| M2GL010-FG484 | M2GL025-FCSG325I | M2GL050-FCS325 | M2GL060-1VFG400I | M2GL090-1FGG676I |
| M2GL010-FG484I | M2GL025-FG484 | M2GL050-FCS325I | M2GL060-FCS325 | M2GL090-FCS325 |
| M2GL010-FGG484 | M2GL025-FG484I | M2GL050-FCSG325 | M2GL060-FCS325I | M2GL090-FCS325I |
| M2GL010-FGG484I | M2GL025-FGG484 | M2GL050-FCSG325I | M2GL060-FCSG325 | M2GL090-FCSG325 |
| M2GL010S-1TQ144 | M2GL025-FGG484I | M2GL050-FG484 | M2GL060-FCSG325I | M2GL090-FCSG325I |
| M2GL010S-1TQ144I | M2GL025T-1FCS325 | M2GL050-FG484I | M2GL060-FG484 | M2GL090-FG484 |
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| M2GL010S-1TQG144I | M2GL025T-1FCSG325 | M2GL050-FG896I | M2GL060-FG676 | M2GL090-FG676 |
| M2GL010S-1TQG144T2 | M2GL025T-1FCSG325I | M2GL050-FGG484 | M2GL060-FG676I | M2GL090-FG676I |
| M2GL010S-TQ144 | M2GL025T-1FG484 | M2GL050-FGG484I | M2GL060-FGG484 | M2GL090-FGG484 |
| M2GL010S-TQ144I | M2GL025T-1FG484I | M2GL050-FGG896 | M2GL060-FGG484I | M2GL090-FGG484I |
| M2GL010S-TQG144 | M2GL025T-1FG484M | M2GL050-FGG896I | M2GL060-FGG676 | M2GL090-FGG676 |
| M2GL010S-TQG144I | M2GL025T-1FGG484 | M2GL050T-1FCS325 | M2GL060-FGG676I | M2GL090-FGG676I |
| M2GL010T-1FG484 | M2GL025T-1FGG484I | M2GL050T-1FCS325I | M2GL060T-1FCS325 | M2GL090T-1FCS325 |
| M2GL090T-1FCS325I | M2GL090TS-1FCS325 | M2GL090TS-FGG484I | M2GL150-FCVG484 | M2GL150T-FCV484 |
| M2GL090T-1FCSG325 | M2GL090TS-1FCS325I | M2GL090TS-FGG676 | M2GL150-FCVG484I | M2GL150T-FCV484I |
| M2GL090T-1FCSG325I | M2GL090TS-1FCSG325 | M2GL090TS-FGG676I | M2GL150T-1FC1152 | M2GL150T-FCVG484 |
| M2GL090T-1FG484 | M2GL090TS-1FCSG325I | M2GL150-1FC1152 | M2GL150T-1FC1152I | M2GL150T-FCVG484I |
| M2GL090T-1FG484I | M2GL090TS-1FG484 | M2GL150-1FC1152I | M2GL150T-1FC1152M | M2GL150TS-1FC1152 |
| M2GL090T-1FG484M | M2GL090TS-1FG484I | M2GL150-1FCG1152 | M2GL150T-1FCG1152 | M2GL150TS-1FC1152I |

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| M2GL090T-1FG676 | M2GL090TS-1FG484M | M2GL150-1FCG1152I | M2GL150T-1FCG1152I | M2GL150TS-1FC1152M |
| M2GL090T-1FG676I | M2GL090TS-1FG676 | M2GL150-1FCS536 | M2GL150T-1FCG1152M | M2GL150TS-1FCG1152 |
| M2GL090T-1FGG484 | M2GL090TS-1FG676I | M2GL150-1FCS536I | M2GL150T-1FCS536 | M2GL150TS-1FCG1152I |
| M2GL090T-1FGG484I | M2GL090TS-1FGG484 | M2GL150-1FCSG536 | M2GL150T-1FCS536I | M2GL150TS-1FCG1152M |
| M2GL090T-1FGG484M | M2GL090TS-1FGG484I | M2GL150-1FCSG536I | M2GL150T-1FCSG536 | M2GL150TS-1FCS536 |
| M2GL090T-1FGG676 | M2GL090TS-1FGG484M | M2GL150-1FCV484 | M2GL150T-1FCSG536I | M2GL150TS-1FCS536I |
| M2GL090T-1FGG676I | M2GL090TS-1FGG484T2 | M2GL150-1FCV484I | M2GL150T-1FCV484 | M2GL150TS-1FCSG536 |
| M2GL090T-FCS325 | M2GL090TS-1FGG676 | M2GL150-1FCVG484 | M2GL150T-1FCV484I | M2GL150TS-1FCSG536I |
| M2GL090T-FCS325I | M2GL090TS-1FGG676I | M2GL150-1FCVG484I | M2GL150T-1FCV484M | M2GL150TS-1FCV484 |
| M2GL090T-FCSG325 | M2GL090TS-1FGG676T2 | M2GL150-FC1152 | M2GL150T-1FCVG484 | M2GL150TS-1FCV484I |
| M2GL090T-FCSG325I | M2GL090TS-FCS325 | M2GL150-FC1152I | M2GL150T-1FCVG484I | M2GL150TS-1FCV484M |
| M2GL090T-FG484 | M2GL090TS-FCS325I | M2GL150-FCG1152 | M2GL150T-FC1152 | M2GL150TS-1FCVG484 |
| M2GL090T-FG484I | M2GL090TS-FCSG325 | M2GL150-FCG1152I | M2GL150T-FC1152I | M2GL150TS-1FCVG484I |
| M2GL090T-FG676 | M2GL090TS-FCSG325I | M2GL150-FCS536 | M2GL150T-FCG1152 | M2GL150TS-FC1152 |
| M2GL090T-FG676I | M2GL090TS-FG484 | M2GL150-FCS536I | M2GL150T-FCG1152I | M2GL150TS-FC1152I |
| M2GL090T-FGG484 | M2GL090TS-FG484I | M2GL150-FCSG536 | M2GL150T-FCS536 | M2GL150TS-FCG1152 |
| M2GL090T-FGG484I | M2GL090TS-FG676 | M2GL150-FCSG536I | M2GL150T-FCS536I | M2GL150TS-FCG1152I |
| M2GL090T-FGG676 | M2GL090TS-FG676I | M2GL150-FCV484 | M2GL150T-FCSG536 | M2GL150TS-FCS536 |
| M2GL090T-FGG676I | M2GL090TS-FGG484 | M2GL150-FCV484I | M2GL150T-FCSG536I | M2GL150TS-FCS536I |
| M2GL150TS-FCSG536 | M2GL150TS-FCSG536I | M2GL150TS-FCV484 | M2GL150TS-FCV484I | M2GL150TS-FCV484 |
| M2GL150TS-FCVG484I | | | | |



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