Emulator to Target Connection Methods

Target Adapters

In the following descriptions of the adapters and flex cables we refer to some of them as "sets". A "set" means that the adapter or flex cable contains all the necessary parts to connect the emulator to the target board. The sets are listed under their specific sub-families. The information is presented first with representative photos, then with charts and followed on the next page by detailed adapter descriptions. The replacement components that make up the sets are listed starting on page 49 of this document.

The HC12 CPUs mostly come in Quad-Flat-Pack (QFP) packages of 48, 52, 80, 112 or 144-pins. In order to connect the emulator system to the target QFP pin pattern (where the CPU will eventually be placed), an adapter set is usually used. The basic adapter set consists of two components - the solder down adapter base (either NQ or TQ), and an adapter PCB.

The solder down adapter base, is a special part designed for adapters. On its bottom it has pins arranged in the specified QFP pin pattern. These pins are soldered down on the target QFP pin pattern. It has an identical mechanical QFP structure as the CPU. On its top side, the adapter base has a special pin grid array (PGA) male pin arrangement, which is used to connect to an adapter PCB. Nohau usually uses solder down adapter bases made by Tokyo Eletech (see below for more details).
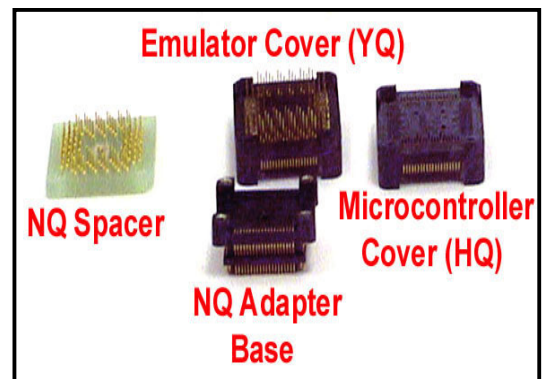
The adapter PCB is used to connect the emulator motherboard bottom connector and the solder down base top connector. Its top side plugs to the header pins on the bottom of the emulator motherboard, and its bottom side plugs to the PGA male pins on the top of the QFP adapter base.

Together the solder down adapter base and the adapter PCB form a basic adapter set, used to connect the emulator system to the QFP pin pattern on the target.

Another less common connection method is to design 0.1" header sockets on the target, so the headers on the emulator bottom will plug directly into the target sockets. The reason it is less common is because you still have to remove the processor from the target because it can't be tri-stated. The mechanical dimensions and pin arrangement of the emulator headers are available at: www.nohau.com/documents and they are located under the technical publications link. Please contact support@nohau.com for the required information.

Tokyo Eletech NQ and TQ QFP Adapter Notes

The Tokyo Eletech NQ adapter is made up of three parts called NQ/HQ/YQ - sockets. The bottom NQ part solders to the target board in place of the target CPU. The HQ microcontroller cover part allows a real HC12 chip to be used on the adapter instead of the emulator for final testing. The third YQ emulator cover part connects the emulator to this solder-down adapter base. There is also an optional sacrificial spacer that is used to protect the solder-down adapter male pins and to provide about 1/8" (3.75mm) of clearance. Replacement solder-down parts can be purchased separately.

Emulator Cover (YQ)
NQ Spacer
Microcontroller Cover (HQ)
NQ Adapter Base

The Tokyo Eletech TQ adapter is used for connecting a target board to an emulator. It is simpler and less expensive than the NQ adapter. There is no provision to install a real chip in the target using a TQ adapter.

TQ Spacer   TQ Adapter Base

BGA Solder-Down Adaptersw

The MC9S12XEP100 is offerred additionally in the 208 pin BGA package. For these newest BGA options, Nohau offers BGA solder-down adapter kits, that are similar in concept to the above NQ QFP adapter kit, but use a BGA solder-down base. These BGA adapter kits allow the option to connect the solder-down base on the target either to the emulator system, or to a BGA solder-socket to mount an actual S12X device for stand-alone operation of the same physical target board. (for more details, refer to the relevant S12X sub-family adapter kits)
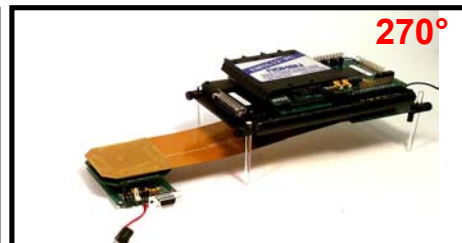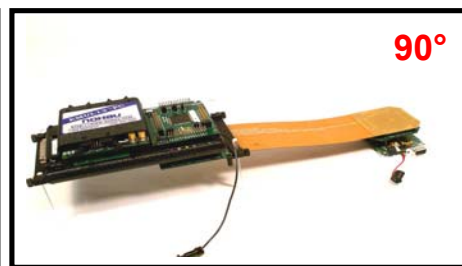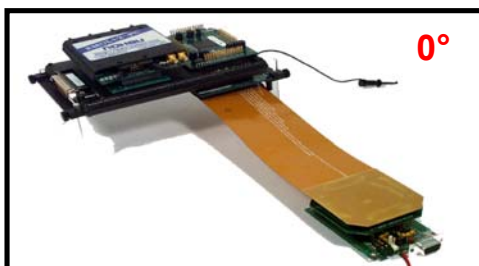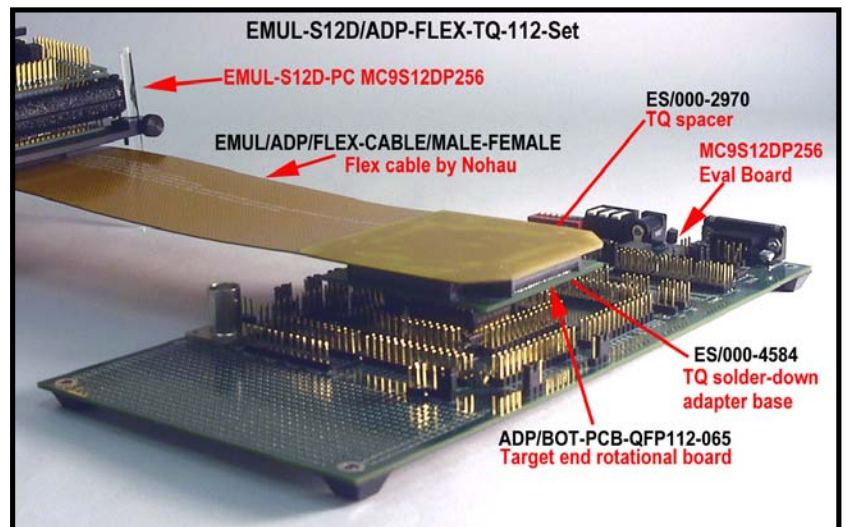
Emulator to Target Connection Methods (Continued)

Flex Cables

A flex cable adapter may be used in applications where access to the target is limited, so a plain solder-down adapter can not be used, since the emulator would have to be physically positioned above the target. The Nohau flex cable allows for all the signals from the solder-down adapter on the target to escape from the target at any of the four directions - 0°, 90°, 180° or 270°. A typical Nohau flex cable adapter consists of the following four basic elements: the flex cable, a top emulator end rotational board, a bottom target end rotational board, and a Tokyo Eletech solder-down base - TQ or NQ.

The top rotational board is used to connect between the emulator motherboard and the flex cable. The bottom target end rotational board is used to connect between the Tokyo Eletech solder-down base and flex cable. Both top and bottom rotational boards can be plugged to the flex cable in orientation of 0°, 90°, 180° and 270°. Connecting both rotational boards to the flex cable using one of these orientations allows for the flex cable to escape from the target at any of these four directions.
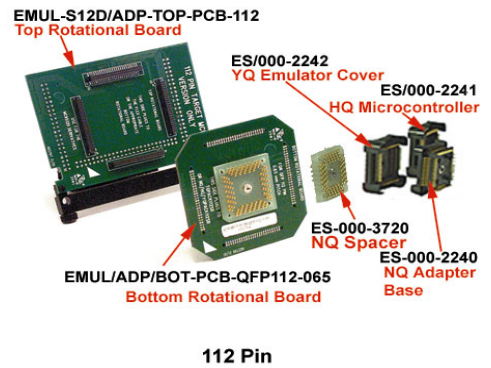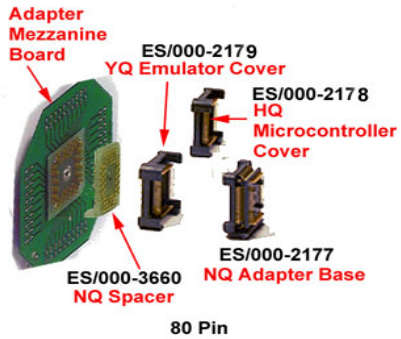
Nohau offers several flex cable types which are used for different flex cable adapters. The most common is the Nohau complete flex design using Nohau rotational boards and the Nohau flex cable with opposite Male-Female connectors. This flex cable allows the top and bottom rotational boards to be also plugged into each other for a plain no-flex cable adapter solution. (This last flex cable design supports all the new S12X and HCS12 derivatives). There is also the Motorola flex cable with the Motorola top and bottom adapter boards which are not rotational, and the Motorola rotational boards using the Nohau flex cable. These are for the older HC12 (old-generation) devices, and for the MC9S12H family. Each S12X, HCS12 and HC12 sub family is usually offered with several flex cable options for all the various pin-counts and available packages.

EMUL-S12D/ADP-FLEX-TQ-112-Set

EMUL-S12D-PC MC9S12DP256

EMUL/ADP/FLEX-CABLE/MALE-FEMALE
Flex cable by Nohau

ES/000-2970
TQ spacer

MC9S12DP256
Eval Board

ES/000-4584
TQ solder-down
adapter base

ADP/BOT-PCB-QFP112-065
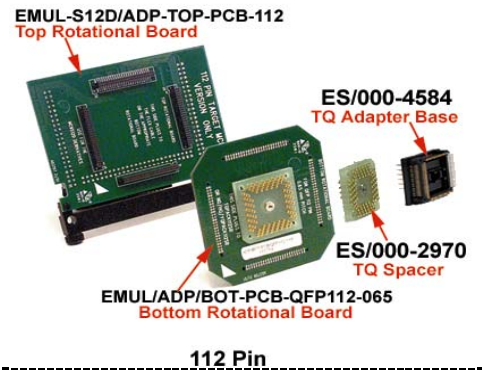Target end rotational board

0°

90°

180°

270°

Emulator to Target Adapter Examples

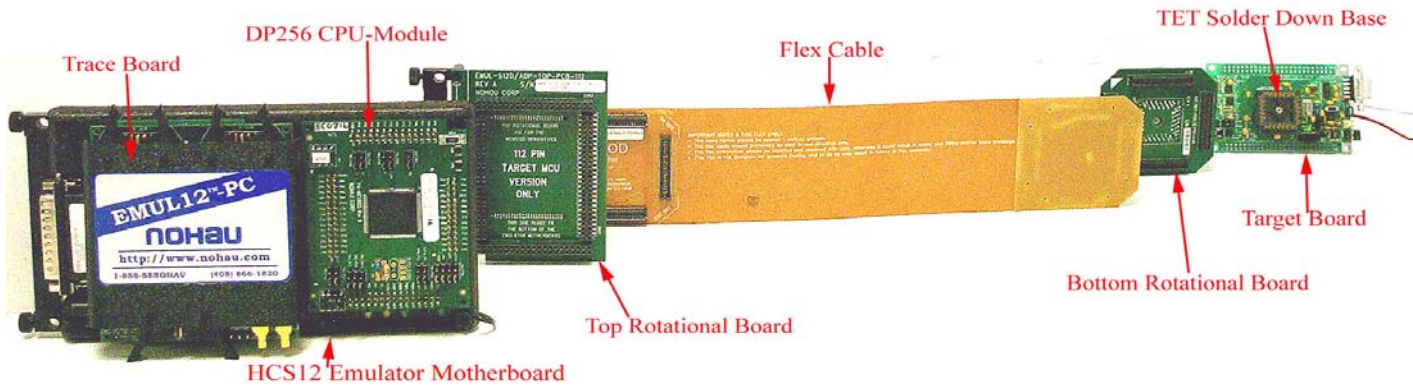The following examples of plain adapter (no flex) and flex cable sets are only representations of the HC12 sets.

NQ Plain Adapter Set Examples (no flex)

TQ Plain Adapter Set Examples (no flex)

Adapter Flex Cable Set Example

Emulator to Target Adapter Organization

The Target Adapters are divided up into the following S12X, HCS12 and HC12 sub-families to make it easier to determine the traget adapter parts you need:

S12X Sub-families Target Adapters

S12X E, D, B, and A sub-families consist of the MC9S12XDP512, MC9S12EP100 and other S12X parts. The charts and adapter descriptions can be found on pages 26-32.

S12XF sub-family consist of the MC9S12XFR128, MC9S12XFE128 and other S12XF parts. The charts and adapter descriptions can be found on pages 33-38.

HCS12 Sub-families Target Adapters

HCS12 C consists of C32, C64, C96 and C128. The charts and adapter descriptions can be found on pages 39-42.

HCS12 K, D, B and A consists of KT256, KG256, KG128, K64, K32, DP512, DT512, DJ512, DP256, DT256, DJ256, DG256, DT128, DJ128, DG128, DB128, DJ64, D64, D32, B256, B128, B64, A512, A256, A128, A64 and A32. The charts and adapter descriptions can be found on pages 43-46.

HCS12 E consists of E256, E128, E64 and E32. The charts and adapter descriptions can be found on pages 47-49.

HCS12 H consists of H256, H128 and H64. The charts and adapter descriptions can be found on pages 50-51.

HCS12 T consists of T64. The charts and adapter descriptions can be found on pages 52-53.

HC12 Sub-families Target Adapters

HC12 B consists of B32, BC32, BD32 and BE32. The charts and adapter descriptions can be found on pages 54-55.

HC12 D consists of D60, D60A, DA128, DA128A, DG128, DG128A and DT128A. The charts and adapter descriptions can be found on pages 56-57.

How the adapters are organized within each sub-family

At the beginning of each sub-family there are three charts, then detailed descriptions with part numbers and prices.

Adapter Sets Selection Chart	This chart includes **all** of the adapter set part numbers available for that specific sub-family, both the plain adapter sets (no flex) and the adapter sets that include the flex cables. It has the sets organized by rows of NQ then TQ plain adapter sets, then NQ and TQ Flex cable adapter sets. The part numbers are in columns by the pin count of the adapters.
Plain Adapter Sets Component Chart	This chart expands the information in the first chart above. It lists the individual part numbers that make up the plain adapter sets. It has the plain adapter sets organized by rows of pin count, first by pin count of the NQ adapters then by the TQ adapters.
Flex Cable Adapter Sets Component Chart	This chart also expands the information in the first chart. It lists the individual part numbers that make up the flex cable adapter sets. It has the flex cable adapter sets organized by rows of pin count, first by pin count of the NQ adapters then by the TQ adapters.

Following the charts in each section, the detailed descriptions of the sets are listed including the part numbers and prices. These follow the same structure as the charts where they are first done by pin count, first by NQ then TQ with the plain adapter sets section first, then the flex cable sets section.

Emulator to Target Adapters and Accessories

S12X E, D, B and A Family Adapter Sets Selection Chart
(MC9S12XDP512, MC9S12XEP100, etc.)

	80 Pin	112 Pin	144 Pin
NQ Adapter Base Set	EMUL-S12XD/ADP-NQ-80-Set Price:	EMUL-S12XD/ADP-NQ-112-Set Price:	EMUL-S12XD/ADP-NQ-144-Set Price:
TQ Adapter Base Set	EMUL-S12XD/ADP-TQ-80-Set Price:	EMUL-S12XD/ADP-TQ-112-Set Price:	EMUL-S12XD/ADP-TQ-144-Set Price:
NQ Adapter Base + Flex Cable Set	EMUL-S12XD/ADP-FLEX-NQ-80-Set Price:	EMUL-S12XD/ADP-FLEX-NQ-112-Set Price:	EMUL-S12XD/ADP-FLEX-NQ-144-Set Price:
TQ Adapter Base + Flex Cable Set	EMUL-S12XD/ADP-FLEX-TQ-80-Set Price:	EMUL-S12XD/ADP-FLEX-TQ-112-Set Price:	EMUL-S12XD/ADP-FLEX-TQ-144-Set Price:

	208 Pin BGA 1mm ball-pitch S12XE Adapters
BGA adapter set with Tin-Lead solder-spheres base	EMUL-S12XE/ADP-BGA-208-TL-Set Price:
BGA adapter set with Lead-Free SAC305 solder-spheres base	EMUL-S12XE/ADP-BGA-208-LF-Set Price:
Flex-Cable BGA adapter set with Tin-Lead solder-spheres base	EMUL-S12XE/ADP-FLEX-BGA-208-TL-Set Price:
Flex-Cable BGA adapter set with Lead-Free SAC305 solder-spheres base	EMUL-S12XE/ADP-FLEX-BGA-208-LF-Set Price:

Emulator to Target Adapters and Accessories (Continued)

S12X E, D, B and A Family Plain Adapter Sets Component Chart

Pin Count	Adapter Set	Parts that make up the set and can be purchased separately			
		NQ or TQ Adapter Base	HQ Microcontroller Cover	YQ Emulator Cover	NQ or TQ Spacer
80-Pin NQ	EMUL-S12XD/ADP-NQ-80-Set Price:	ES/000-2177 (NQPACK080SB) Price:	ES/000-2178 (HQPACK080SB) Price:	ES/000-2179 (YQPACK080SB) Price:	ES/000-3660 (YQSOCKET080SBF) Price:
80-Pin TQ	EMUL-S12XD/ADP-TQ-80-Set Price:	ES/000-4534 (TQPACK080SB) Price:			ES/000-2870 (TQSOCKET080SBW) Price:
112-Pin NQ	EMUL-S12XD/ADPNQ-112-Set Price:	ES/000-2240 (NQPACK112SB) Price:	ES/000-2241 (HQPACK112SB) Price:	ES/000-2242 (YQPACK112SB) Price:	ES/000-3720 (YQSOCKET112SBF) Price:
112-Pin TQ	EMUL-S12XD/ADP-TQ-112-Set Price:	ES/000-4584 (TQPACK112SB) Price:			ES/000-2970 (TQSOCKET112SBW) Price:
144-Pin NQ	EMUL-S12XD/ADP-NQ-144-Set Price:	ES/000-2303 (NQPACK144SD) Price:	ES/000-2304 (HQPACK144SD) Price:	ES/000-2305 (YQPACK144SD) Price:	ES/000-3776 (YQSOCKET144SDF) Price:
144-Pin TQ	EMUL-S12XD/ADP-TQ-144-Set Price:	ES/000-4632 (TQPACK144SD) Price:			ES/000-3065 (TQSOCKET144SDG) Price:

Pin Count	Adapter Set	Parts that make up the set and can be purchased separately			
		BGA Solder-Down Base	BGA Microcontroller IC Adapter	BGA Spacer	Rotational Boards
208-Pin BGA with Tin-Lead base	EMUL-S12XE/ADP-BGA-208-TL-Set Price:	ES/000-4078-01 Price:	ES/140-1127-00 Price:	ES/030-1127-00 Price:	EMUL-S12XE/ADP-TOP PCB-208 and ADP/BOT-PCB/S12XE-BGA208-1MM
208-Pin BGA with Lead-Free base	EMUL-S12XE/ADP-BGA-208-LF-Set Price:	ES/000-4078-00 Price:	ES/140-1127-00 Price:	ES/030-1127-00 Price:	EMUL-S12XE/ADP-TOP PCB-208 and ADP/BOT-PCB/S12XE-BGA208-1MM

Emulator to Target Adapters and Accessories (Continued)

S12X E, D, B and A Family Adapter Flex Cable Sets Component Chart

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement Adapter TQ or NQ/HQ/YQ	Replacement Spacer	Replacement Rotational Boards
80-Pin NQ	EMUL-S12XD/ADP-FLEX-NQ-80 Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2177/9/8 (NQ/HQ/YQPACK080SB) Price:	ES/000-3660 (YQSOCKET080SBF) Price:	EMUL-S12XD/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065
80-Pin TQ	EMUL-S12XD/ADP-FLEX-TQ-80-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4534 (TQPACK080SB) Price:	ES/000-2870 (TQSOCKET080SBW) Price:	EMUL-S12XD/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065
112-Pin NQ	EMUL-S12XD/ADP-FLEX-NQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2240/1/2 (NQ/HQ/YQPACK112SB) Price:	ES/000-3720 (YQSOCKET112SBF) Price:	EMUL-S12XD/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065
112-Pin TQ	EMUL-S12XD/ADP-FLEX-TQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4584 (TQPACK112SB) Price:	ES/000-2970 (TQSOCKET112SBW) Price:	EMUL-S12XD/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065
144-Pin NQ	EMUL-S12XD/ADP-FLEX-NQ-144-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2303/4/5 (NQ/HQ/YQPACK144SD) Price:	ES/000-3776 (YQSOCKET144SDF) Price:	EMUL-S12XD/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050
144-Pin TQ	EMUL-S12XD/ADP-FLEX-TQ-144-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4632 (TQPACK144SD) Price:	ES/000-3065 (TQSOCKET144SDG) Price:	EMUL-S12XD/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement BGA Adapter base + BGA IC Adapter	Replacement BGA Spacer	Replacement Rotational Boards
208-Pin BGA with Tin-Lead base	EMUL-S12XE/ADP-FLEX-BGA-208-TL-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4078-01 and ES/140-1127-00 Price:	ES/030-1127-00 Price:	EMUL-S12XE/ADP-TOP-PCB-208 and ADP/BOT-PCB/S12XE-BGA208-1MM
208-Pin BGA with Lead-Free base	EMUL-S12XE/ADP-FLEX-BGA-208-LF-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4078-00 and ES/140-1127-00 Price:	ES/030-1127-00 Price:	EMUL-S12XE/ADP-TOP-PCB-208 and ADP/BOT-PCB/S12XE-BGA208-1MM

Emulator to Target Adapters and Accessories (Continued)

S12X E, D, B and A Family Adapter Sets (MC9S12XDP512, MC9S12XEP100 etc.)

S12X E, D, B and A Plain QFP Adapter Sets (no flex cable)

* S12XD & S12XE 80-pin NQ adapter set	This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 80-pin QFP target. This set consists of a solder-down NQ adapter base, part # ES/000-2177 (NQPACK080SB), a microcontroller cover, part # ES/000-2178 (HQPACK080SB), an emulator cover, part # ES/000-2179 (YQPACK080SB), a spacer, part # ES/000-3660 (YQSOCKET080SBF) and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12XD/ ADP-NQ-80-Set**
* S12XD & S12XE 80-pin TQ adapter set	This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 80-pin QFP target. This set consists of a solder-down TQ adapter base, part # ES/000-4534 (TQPACK080SB), a spacer, part # ES/000-2870 (TQSOCKET080SBW) and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12XD/ ADP-TQ-80-Set**
* S12XD & S12XE 112-pin NQ adapter set	This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 112-pin QFP target. This set consists of a solder-down NQ adapter base, part # ES/000-2240 (NQPACK112SB), a microcontroller cover, part # ES/000-2241 (HQPACK112SB), an emulator cover, part # ES/000-2242 (YQPACK112SB), a spacer, part # ES/000-3720 (YQSOCKET112SBF) and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12XD/ ADP-NQ-112-Set**
* S12XD & S12XE 112-pin TQ adapter set	This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 112-pin QFP target. This set consists of a solder-down TQ adapter base, part # ES/000-4584 (TQPACK112SB), a spacer, part # ES/000-2970 (TQSOCKET112SBW) and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12XD/ ADP-TQ-112-Set**
* S12XD & S12XE 144-pin NQ adapter set	This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 144-pin QFP target. This set consists of a solder-down NQ adapter base, part # ES/000-2303 (NQPACK144SD), a microcontroller cover, part # ES/000-2304 (HQPACK144SD), an emulator cover, part # ES/000-2305 (YQPACK144SD), a spacer, part # ES/000-3776 (YQSOCKET144SDF) and the 144-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050.	**EMUL-S12XD/ ADP-NQ-144-Set**
* S12XD & S12XE 144-pin TQ adapter set	This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 144-pin QFP target. This set consists of a solder-down TQ adapter base, part # ES/000-4632 (TQPACK144SD), a spacer, part # ES/000-3065 (TQSOCKET144SDG) and the 144-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050.	**EMUL-S12XD/ ADP-TQ-144-Set**

Emulator to Target Adapters and Accessories (Continued)

S12X E, D, B and A Family Adapter Sets (MC9S12XDP512, MC9S12XEP100 etc.) continued

S12X E, D, B and A Flex-Cable QFP Adapter Sets

* S12XD & S12XE 80-pin NQ flex-cable adapter set

This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 80-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down NQ adapter base, part # ES/000-2177 (NQPACK080SB), a microcontroller cover, part # ES/000-2178 (HQPACK080SB), an emulator cover, part # ES/000-2179 (YQPACK080SB), a spacer, part # ES/000-3660 (YQSOCKET080SBF), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 80-pin top (emulator end) and bottom (target end) rotational boards, part #EMUL-S12XD/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.

EMUL-S12XD/ADP-FLEX-NQ-80-Set

* S12XD & S12XE 80-pin TQ flex-cable adapter set

This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 80-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down TQ adapter base, part # ES/000-4534 (TQPACK080SB), a spacer, part # ES/000-2870 (TQSOCKET080SBW), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.

EMUL-S12XD/ADP-FLEX-TQ-80-Set

* S12XD & S12XE 112-pin NQ flex-cable adapter set

This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 112-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down NQ adapter base, part # ES/000-2240 (NQPACK112SB), a microcontroller cover, part # ES/000-2241 (HQPACK112SB), an emulator cover, part # ES/000-2242 (YQPACK112SB), a spacer, part # ES/000-3720(YQSOCKET112SBF), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.

EMUL-S12XD/ADP-FLEX-NQ-112-Set

* S12XD & S12XE 112-pin TQ flex-cable adapter set

This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 112-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down TQ adapter base, part # ES/000-4584 (TQPACK112SB), a spacer, part # ES/000-2970 (TQSOCKET112SBW), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.

EMUL-S12XD/ADP-FLEX-TQ-112-Set

Emulator to Target Adapters and Accessories (Continued)

S12X E, D, B and A Family Adapter Sets (MC9S12XDP512, MC9S12XEP100 etc.) continued

S12X E, D, B and A Flex-Cable QFP Adapter Sets (Continued)

* S12XD & S12XE 144-pin NQ flex-cable adapter set	This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 144-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down NQ adapter base, part # ES/000-2303 (NQPACK144SD), a microcontroller cover, part # ES/000-2304 (HQPACK144SD), an emulator cover, part # ES/000-2305 (YQPACK144SD), a spacer, part # ES/000-3776 (YQSOCKET144SDF), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE,and the 144-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050.	**EMUL-S12XD/ADP-FLEX-NQ-144-Set**
* S12XD & S12XE 144-pin TQ flex-cable adapter set	This set contains the required components to connect an S12XD or S12XE emulator system to an S12XD or S12XE family 144-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down TQ adapter base, part # ES/000-4632 (TQPACK144SD), a spacer, part # ES/000-3065 (TQSOCKET144SDG) , a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 144-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XD/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050.	**EMUL-S12XD/ADP-FLEX-TQ-144-Set**

Emulator to Target Adapters and Accessories (Continued)

S12X E, D, B and A Family Adapter Sets (MC9S12XDP512, MC9S12XEP100 etc.) continued

S12XE 208 pin BGA Adapter Sets (with & without Flex-Cable)

The S12XE family is additionally offered in a 208-pin BGA package with 1mm ball-pitch, that is not available for the S12XD, S12XB and S12XA families. The following four BGA adapter-sets offer options to connect an S12XE target board that uses the 208-pin BGA footprint to an S12XE full-emulator system. These four adapter-sets share many common components, and differ from one another by the two options of: **(a)** With or without Flex-Cable. **(b)** With a solder down BGA base with Tin-Lead solder-spheres which requires traditional Tin-Lead BGA-target assembly process, or alternatively a solder-down BGA base with Lead-Free (RoHS Compliant) SAC305 solder-spheres which requires higher-temperature Lead-Free BGA-target assembly process. All four adapter-sets contain all the required components to connect an S12XE emulator system to an S12XE family 208-pin BGA target footprint. They connect the target board to either the S12XE emulator system, or to an S12XE microcontroller IC soldered on the supplied IC adapter - to test stand alone or BDM operation with the same physical target.

The connection of the following 4 adapter sets is done as follows: **(a)** The BGA solder-down base is soldered by the user on his target BGA footprint. **(b)** The BGA spacer plugs to the top side of the solder-down base. **(c)** For emulator connection, the bottom rotational board plugs to the top side of the BGA spacer, and on the other side plugs directly to the top-rotational board and the S12XE emulator system, or through the Flex-Cable, to the top rotational board and the S12XE emulator system. **(d)** For stand-alone or BDM operation of the same physical target board, a BGA microcontroller is soldered by the user on top of the IC adapter, which plugs on its other side to the top side of the BGA spacer.

* S12XE BGA 208-pin adapter set - Tin-Lead base (non-ROHS compliant)	This set contains the required components to connect an S12XE emulator system to an S12XE family 208-pin BGA target footprint. This set consists of a BGA solder-down base with Tin-Lead solder-spheres, part # ES/000-4078-01, a microcontroller IC adapter, part # ES/140-1127-00, a BGA spacer, part # ES/030-1127-00, and the 208-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XE/ADP-TOP-PCB-208 and ADP/BOT-PCB/S12XE-BGA208-1MM.	**EMUL-S12XE/ ADP-BGA-208-TL-Set**
* S12XE BGA 208-pin adapter set - Lead-Free base (ROHS compliant)	This set contains the required components to connect an S12XE emulator system to an S12XE family 208-pin BGA target footprint. This set consists of a BGA solder-down base with Lead-Free SAC305 solder-spheres (RoHS Compliant), part # ES/000-4078-00, a microcontroller IC adapter, part # ES/140-1127-00, a BGA spacer, part # ES/030-1127-00, and the 208-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XE/ADP-TOP-PCB-208 and ADP/BOT-PCB/S12XE-BGA208-1MM.	**EMUL-S12XE/ ADP-BGA-208-LF-Set**
* S12XE flex-cable BGA 208-pin adapter set - Tin-Lead base (non-ROHS compliant)	This set contains the required components to connect an S12XE emulator system to an S12XE family 208-pin BGA target footprint using a flex-cable. This set consists of a BGA solder-down base with Tin-Lead solder-spheres, part # ES/000-4078-01, a microcontroller IC adapter, part # ES/140-1127-00, a BGA spacer, part # ES/030-1127-00, a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 208-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XE/ADP-TOP-PCB-208 and ADP/BOT-PCB/S12XE-BGA208-1MM.	**EMUL-S12XE/ ADP-FLEX-BGA-208-TL-Set**
* S12XE flex-cable BGA 208-pin adapter set - Lead-Free base (ROHS compliant)	This set contains the required components to connect an S12XE emulator system to an S12XE family 208-pin BGA target footprint using a flex-cable. This set consists of a BGA solder-down base with Lead-Free SAC305 solder-spheres (RoHS Compliant), part # ES/000-4078-00, a microcontroller IC adapter, part # ES/140-1127-00, a BGA spacer, part # ES/030-1127-00, a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 208-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XE/ADP-TOP-PCB-208 and ADP/BOT-PCB/S12XE-BGA208-1MM.	**EMUL-S12XE/ ADP-FLEX-BGA-208-LF-Set**

Emulator to Target Adapters and Accessories (Continued)

S12XF Family Adapter Sets Selection Chart
(MC9S12XFR128, MC9S12XFE128, etc.)

	64 Pin	80 Pin	112 Pin	144 Pin
NQ Adapter Base Set	EMUL-S12XF/ADP-NQ-64-Set Price:	EMUL-S12XF/ADP-NQ-80-Set Price:	EMUL-S12XF/ADP-NQ-112-Set Price:	EMUL-S12XF/ADP-NQ-144-Set Price:
TQ Adapter Base Set	EMUL-S12XF/ADP-TQ-64-Set Price:	EMUL-S12XF/ADP-TQ-80-Set Price:	EMUL-S12XF/ADP-TQ-112-Set Price:	EMUL-S12XF/ADP-TQ-144-Set Price:
NQ Adapter Base + Flex Cable Set	EMUL-S12XF/ADP-FLEX-NQ-64-Set Price:	EMUL-S12XF/ADP-FLEX-NQ-80-Set Price:	EMUL-S12XF/ADP-FLEX-NQ-112-Set Price:	EMUL-S12XF/ADP-FLEX-NQ-144-Set Price:
TQ Adapter Base + Flex Cable Set	EMUL-S12XF/ADP-FLEX-TQ-64-Set Price:	EMUL-S12XF/ADP-FLEX-TQ-80-Set Price:	EMUL-S12XF/ADP-FLEX-TQ-112-Set Price:	EMUL-S12XF/ADP-FLEX-TQ-144-Set Price:

Emulator to Target Adapters and Accessories (Continued)

S12XF Family Plain Adapter Sets Component Chart

Pin Count	Adapter Set	Parts that make up the set and can be purchased separately			
		NQ or TQ Adapter Base	HQ Microcontroller Cover	YQ Emulator Cover	NQ or TQ Spacer
64-Pin NQ	EMUL-S12XF/ADP-NQ-64-Set Price:	ES/000-2105 (NQPACK064SD) Price:	ES/000-2106 (HQPACK064SD) Price:	ES/000-2107 (YQPACK064SD) Price:	ES/000-3610 (YQSOCKET064SDF) Price:
64-Pin TQ	EMUL-S12XF/ADP-TQ-64-Set Price:	ES/000-4492 (TQPACK064SD) Price:			ES/000-2786 (TQSOCKET064SDW) Price:
80-Pin NQ	EMUL-S12XF/ADP-NQ-80-Set Price:	ES/000-2177 (NQPACK080SB) Price:	ES/000-2178 (HQPACK080SB) Price:	ES/000-2179 (YQPACK080SB) Price:	ES/000-3660 (YQSOCKET080SBF) Price:
80-Pin TQ	EMUL-S12XF/ADP-TQ-80-Set Price:	ES/000-4534 (TQPACK080SB) Price:			ES/000-2870 (TQSOCKET080SBW) Price:
112-Pin NQ	EMUL-S12XF/ADP-NQ-112-Set Price:	ES/000-2240 (NQPACK112SB) Price:	ES/000-2241 (HQPACK112SB) Price:	ES/000-2242 (YQPACK112SB) Price:	ES/000-3720 (YQSOCKET112SBF) Price:
112-Pin TQ	EMUL-S12XF/ADP-TQ-112-Set Price:	ES/000-4584 (TQPACK112SB) Price:			ES/000-2970 (TQSOCKET112SBW) Price:
144-Pin NQ	EMUL-S12XF/ADP-NQ-144-Set Price:	ES/000-2303 (NQPACK144SD) Price:	ES/000-2304 (HQPACK144SD) Price:	ES/000-2305 (YQPACK144SD) Price:	ES/000-3776 (YQSOCKET144SDF) Price:
144-Pin TQ	EMUL-S12XF/ADP-TQ-144-Set Price:	ES/000-4632 (TQPACK144SD) Price:			ES/000-3065 (TQSOCKET144SDG) Price:

Emulator to Target Adapters and Accessories (Continued)

S12XF Family Flex Cable Adapter Sets Component Chart

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement Adapter TQ or NQ/HQ/YQ	Replacement Spacer	Replacement Rotational Boards
64-Pin NQ	EMUL-S12XF/ADP-FLEX-NQ-64-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2105/6/7 (NQ/HQ/YQPACK064SD) Price:	ES/000-3610 (YQSOCKET064SDF) Price:	EMUL-S12XF/ADP-TOP PCB-64 and ADP/BOT-PCB-QFP64-050
64-Pin TQ	EMUL-S12XF/ADP-FLEX-TQ-64-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4492 (TQPACK064SD) Price:	ES/000-2786 (TQSOCKET064SDW) Price:	EMUL-S12XF/ADP-TOP PCB-64 and ADP/BOT-PCB-QFP64-050
80-Pin NQ	EMUL-S12XF/ADP-FLEX-NQ-80-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2177/9/8 (NQ/HQ/YQPACK080SB) Price:	ES/000-3660 (YQSOCKET080SBF) Price:	EMUL-S12XF/ADP-TOP PCB-80 and ADP/BOT-PCB-QFP80-065
80-Pin TQ	EMUL-S12XF/ADP-FLEX-TQ-80-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4534 (TQPACK080SB) Price:	ES/000-2870 (TQSOCKET080SBW) Price:	EMUL-S12XF/ADP-TOP PCB-80 and ADP/BOT-PCB-QFP80-065
112-Pin NQ	EMUL-S12XF/ADP-FLEX-NQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2240/1/2 (NQ/HQ/YQPACK112SB) Price:	ES/000-3720 (YQSOCKET112SBF) Price:	EMUL-S12XF/ADP-TOP PCB-112 and ADP/BOT-PCB-QFP112-065
112-Pin TQ	EMUL-S12XF/ADP-FLEX-TQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4584 (TQPACK112SB) Price:	ES/000-2970 (TQSOCKET112SBW) Price:	EMUL-S12XF/ADP-TOP PCB-112 and ADP/BOT-PCB-QFP112-065
144-Pin NQ	EMUL-S12XF/ADP-FLEX-NQ-144-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2303/4/5 (NQ/HQ/YQPACK144SD) Price:	ES/000-3776 (YQSOCKET144SDF) Price:	EMUL-S12XF/ADP-TOP PCB-144 and ADP/BOT-PCB-QFP144-050
144-Pin TQ	EMUL-S12XF/ADP-FLEX-TQ-144-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4632 (TQPACK144SD) Price:	ES/000-3065 (TQSOCKET144SDG) Price:	EMUL-S12XF/ADP-TOP PCB-144 and ADP/BOT-PCB-QFP144-050

Emulator to Target Adapters and Accessories (Continued)

S12XF Family Adapter Sets (MC9S12XFR128, MC9S12XFE128 etc.)

S12XF Plain QFP Adapter Sets (no flex cable)

* S12XF 64-pin NQ adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 64-pin QFP target. This set consists of a solder-down NQ adapter base, part # ES/000-2105 (NQPACK064SD), a microcontroller cover, part # ES/000-2106 (HQPACK064SD), an emulator cover, part # ES/000-2107 (YQPACK064SD), a spacer, part # ES/000-3610 (YQSOCKET064SDF) and the 64-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-64 and ADP/BOT-PCB-QFP64-050.	**EMUL-S12XF/ ADP-NQ-64-Set**
* S12XF 64-pin TQ adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 64-pin QFP target. This set consists of a solder-down TQ adapter base, part # ES/000-4492 (TQPACK064SD), a spacer, part # ES/000-2786 (TQSOCKET064SDW) and the 64-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-64 and ADP/BOT-PCB-QFP64-050.	**EMUL-S12XF/ ADP-TQ-64-Set**
* S12XF 80-pin NQ adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 80-pin QFP target. This set consists of a solder-down NQ adapter base, part # ES/000-2177 (NQPACK080SB), a microcontroller cover, part # ES/000-2178 (HQPACK080SB), an emulator cover, part # ES/000-2179 (YQPACK080SB), a spacer, part # ES/000-3660 (YQSOCKET080SBF) and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12XF/ ADP-NQ-80-Set**
* S12XF 80-pin TQ adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 80-pin QFP target. This set consists of a solder-down TQ adapter base, part # ES/000-4534 (TQPACK080SB), a spacer, part # ES/000-2870 (TQSOCKET080SBW) and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12XF/ ADP-TQ-80-Set**
* S12XF 112-pin NQ adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 112-pin QFP target. This set consists of a solder-down NQ adapter base, part # ES/000-2240 (NQPACK112SB), a microcontroller cover, part # ES/000-2241 (HQPACK112SB), an emulator cover, part # ES/000-2242 (YQPACK112SB), a spacer, part # ES/000-3720 (YQSOCKET112SBF) and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12XF/ ADP-NQ-112-Set**
* S12XF 112-pin TQ adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 112-pin QFP target. This set consists of a solder-down TQ adapter base, part # ES/000-4584 (TQPACK112SB), a spacer, part # ES/000-2970 (TQSOCKET112SBW) and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12XF/ ADP-TQ-112-Set**

Emulator to Target Adapters and Accessories (Continued)

S12XF Family Adapter Sets (MC9S12XFR128, MC9S12XFE128 etc.) (Continued)

S12XF Plain QFP Adapter Sets (no flex cable) (continued)

* S12XF 144-pin NQ adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 144-pin QFP target. This set consists of a solder-down NQ adapter base, part # ES/000-2303 (NQPACK144SD), a microcontroller cover, part # ES/000-2304 (HQPACK144SD), an emulator cover, part # ES/000-2305 (YQPACK144SD), a spacer, part # ES/000-3776 (YQSOCKET144SDF) and the 144-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050.	**EMUL-S12XF/ ADP-NQ-144-Set**
* S12XF 144-pin TQ adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 144-pin QFP target. This set consists of a solder-down TQ adapter base, part # ES/000-4632 (TQPACK144SD), a spacer, part # ES/000-3065 (TQSOCKET144SDG) and the 144-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050.	**EMUL-S12XF/ ADP-TQ-144-Set**

S12XF Flex-Cable QFP Adapter Sets

* S12XF 64-pin NQ flex-cable adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 64-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down NQ adapter base, part # ES/000-2105 (NQPACK064SD), a microcontroller cover, part # ES/000-2106 (HQPACK064SD), an emulator cover, part # ES/000-2107 (YQPACK064SD), a spacer, part # ES/000-3610 (YQSOCKET064SDF), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 64-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-64 and ADP/BOT-PCB-QFP64-050.	**EMUL-S12XF/ADP- FLEX-NQ-64-Set**
* S12XF 64-pin TQ flex-cable adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 64-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down TQ adapter base, part # ES/000-4492 (TQPACK064SD), a spacer, part # ES/000-2786 (TQSOCKET064SDW) , a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 64-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-64 and ADP/BOT-PCB-QFP64-050.	**EMUL-S12XF/ADP- FLEX-TQ-64-Set**
* S12XF 80-pin NQ flex-cable adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 80-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down NQ adapter base, part # ES/000-2177 (NQPACK080SB), a microcontroller cover, part # ES/000-2178 (HQPACK080SB), an emulator cover, part # ES/000-2179 (YQPACK080SB), a spacer, part # ES/000-3660 (YQSOCKET080SBF), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 80-pin top (emulator end) and bottom (target end) rotational boards, part #EMUL-S12XF/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12XF/ADP- FLEX-NQ-80-Set**

Emulator to Target Adapters and Accessories (Continued)

S12XF Family Adapter Sets (MC9S12XFR128, MC9S12XFE128 etc.) (Continued)

S12XF Flex-Cable QFP Adapter Sets (no flex cable) (continued)

* S12XF 80-pin TQ flex-cable adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 80-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down TQ adapter base, part # ES/000-4534 (TQPACK080SB), a spacer, part # ES/000-2870 (TQSOCKET080SBW), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12XF/ADP-FLEX-TQ-80-Set**
* S12XF 112-pin NQ flex-cable adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 112-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down NQ adapter base, part # ES/000-2240 (NQPACK112SB), a microcontroller cover, part # ES/000-2241 (HQPACK112SB), an emulator cover, part # ES/000-2242 (YQPACK112SB), a spacer, part # ES/000-3720(YQSOCKET112SBF), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12XF/ADP-FLEX-NQ-112-Set**
* S12XF 112-pin TQ flex-cable adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 112-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down TQ adapter base, part # ES/000-4584 (TQPACK112SB), a spacer, part # ES/000-2970 (TQSOCKET112SBW), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12XF/ADP-FLEX-TQ-112-Set**
* S12XF 144-pin NQ flex-cable adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 144-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down NQ adapter base, part # ES/000-2303 (NQPACK144SD), a microcontroller cover, part # ES/000-2304 (HQPACK144SD), an emulator cover, part # ES/000-2305 (YQPACK144SD), a spacer, part # ES/000-3776 (YQSOCKET144SDF), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 144-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050.	**EMUL-S12XF/ADP-FLEX-NQ-144-Set**
* S12XF 144-pin TQ flex-cable adapter set	This set contains the required components to connect an S12XF emulator system to an S12XF family 144-pin QFP target using a flex-cable, and allows connecting to the target at one any of 4 directions. This set consists of a solder-down TQ adapter base, part # ES/000-4632 (TQPACK144SD), a spacer, part # ES/000-3065 (TQSOCKET144SDG) , a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE, and the 144-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12XF/ADP-TOP-PCB-144 and ADP/BOT-PCB-QFP144-050.	**EMUL-S12XF/ADP-FLEX-TQ-144-Set**

Emulator to Target Adapters and Accessories (Continued)

HCS12 C Family Adapter Sets Selection Chart (C32, C64, C96 and C128)

	48 Pin	52 Pin	80 Pin
NQ Adapter Base Set	EMUL-S12C/ADP-NQ-48-Set Price:	EMUL-S12C/ADP-NQ-52-Set Price:	EMUL-S12C/ADP-NQ-80-Set Price:
TQ Adapter Base Set	EMUL-S12C/ADP-TQ-48-Set Price:	EMUL-S12C/ADP-TQ-52-Set Price:	EMUL-S12C/ADP-TQ-80-Set Price:
NQ Adapter Base + Flex Cable Set	EMUL-S12C/ADP-FLEX-NQ-48-Set Price:	EMUL-S12C/ADP-FLEX-NQ-52-Set Price:	EMUL-S12C/ADP-FLEX-NQ-80-Set Price:
TQ Adapter Base + Flex Cable Set	EMUL-S12C/ADP-FLEX-TQ-48-Set Price:	EMUL-S12C/ADP-FLEX-TQ-52-Set Price:	EMUL-S12C/ADP-FLEX-TQ-80-Set Price:

HCS12 C Family Plain Adapter Sets Component Chart (C32, C64, C96 and C128)

Pin Count	Adapter Set	Parts that make up the set and can be purchased separately			
		NQ or TQ Adapter Base	HQ Microcontroller Cover	YQ Emulator Cover	NQ or TQ Spacer
48-Pin NQ	EMUL-S12C/ADP-NQ-48-Set Price:	ES/000-2075 Price:	ES/000-2076 Price:	ES/000-2077 Price:	ES/000-3574 Price:
48-Pin TQ	EMUL-S12C/ADP-TQ-48-Set Price:	ES/000-4468 Price:			ES/000-2726 Price:
52-Pin NQ	EMUL-S12C/ADP-NQ-52-Set Price:	ES/000-2085 Price:	ES/000-2086 Price:	ES/000-2087 Price:	ES/000-3588 Price:
52-Pin TQ	EMUL-S12C/ADP-TQ-52-Set Price:	ES/000-4472 Price:			ES/000-2756 Price:
80-Pin NQ	EMUL-S12C/ADP-NQ-80-Set Price:	ES/000-2177 Price:	ES/000-2178 Price:	ES/000-2179 Price:	ES/000-3660 Price:
80-Pin TQ	EMUL-S12C/ADP-TQ-80-Set Price:	ES/000-4534 Price:			ES/000-2870 Price:

Emulator to Target Adapters and Accessories (Continued)

HCS12 C Family Flex Cable Adapter Sets Component Chart **(C32, C64, C96 and C128)**

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement Adapter TQ or NQ/HQ/YQ	Replacement Spacer	Replacement Rotational Boards
48-pin NQ	EMUL-S12C/ADP-FLEX-NQ-48 Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2075/6/7	ES/000-3574	EMUL-S12C/ADP-TOP-PCB-48 and ADP/BOT-PCB-QFP48-050
48-pin TQ	EMUL-S12C/ADP-FLEX-TQ-48 Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4468	ES/000-2726	EMUL-S12C/ADP-TOP-PCB-48 and ADP/BOT-PCB-QFP48-050
52-pin NQ	EMUL-S12C/ADP-FLEX-NQ-52 Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2085/6/7	ES/000-3588	EMUL-S12C/ADP-TOP-PCB-52 and ADP/BOT-PCB-QFP52-065
52-pin TQ	EMUL-S12C/ADP-FLEX-TQ-52 Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4472	ES/000-2756	EMUL-S12C/ADP-TOP-PCB-52 and ADP/BOT-PCB-QFP52-065
80-pin NQ	EMUL-S12C/ADP-FLEX-NQ-80 Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2177/8/9	ES/000-3660	EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065
80-pin TQ	EMUL-S12C/ADP-FLEX-TQ-80 Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4534	ES/000-2870	EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065

Emulator to Target Adapters and Accessories (Continued)

HCS12 C Family Adapter Sets (C32, C64, C96 and C128)

HCS12 C Family Plain Adapter Sets (no flex cable)

S12C 48-pin NQ adapter set	This adapter set contains the required components to connect an S12C emulator system to an MC9S12C family 48-pin QFP target. This set consists of a Tokyo Eletech NQ adapter base part # ES/000-2075 (NQPACK048SD), microcontroller cover (HQ) part # ES/000-2076 (HQPACK048SD), emulator cover (YQ) part # ES/000-2077 (YQPACK048SD), spacer part # ES/000-3574 (YQSOCKET048SDF) and the 48-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12C/ADP-TOP-PCB-48 and ADP/BOT-PCB-QFP48-050.	**EMUL-S12C/ADP-NQ-48-Set**
S12C 48-pin TQ adapter set	This adapter set contains the required components to connect an S12C emulator system to an MC9S12C family 48-pin QFP target. This set consists of a Tokyo Eletech TQ adapter base part # ES/000-4468 (TQPACK048SD), a spacer part # ES/000-2726 (TQSOCKET048SDG) and the 48-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12C/ADP-TOP-PCB-48 and ADP/BOT-PCB-QFP48-050.	**EMUL-S12C/ADP-TQ-48-Set**
S12C 52-pin NQ adapter set	This adapter set contains the required components to connect an S12C emulator system to an MC9S12C family 52-pin QFP target. This set consists of a Tokyo Eletech NQ adapter base part # ES/000-2085 (NQPACK052SB), microcontroller cover (HQ) part # ES/000-2086 (HQPACK052SB), emulator cover (YQ) part # ES/000-2087 (YQPACK052SB), spacer part # ES/000-3588 (YQSOCKET052SBF) and the 52-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12C/ADP-TOP-PCB-52 and ADP/BOT-PCB-QFP52-065.	**EMUL-S12C/ADP-NQ-52-Set**
S12C 52-pin TQ adapter set	This adapter set contains the required components to connect an S12C emulator system to an MC9S12C family 52-pin QFP target. This set consists of a Tokyo Eletech TQ adapter base part # ES/000-4472 (TQPACK052SB), a spacer part # ES/000-2756 (TQSOCKET052SBW) and the 52-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12C/ADP-TOP-PCB-52 and ADP/BOT-PCB-QFP52-065.	**EMUL-S12C/ADP-TQ-52-Set**
S12C 80-pin NQ adapter set	This adapter set contains the required components to connect an S12C emulator system to an MC9S12C family 80-pin QFP target. This set consists of a Tokyo Eletech NQ adapter base part # ES/000-2177 (NQPACK080SB), microcontroller cover (HQ) part # ES/000-2178 (HQPACK080SB), emulator cover (YQ) part # ES/000-2179 (YQPACK080SB), spacer part # ES/000-3660 (YQSOCKET080SBF) and the 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12C/ADP-NQ-80-Set**
S12C 80-pin TQ adapter set	This adapter set contains the required components to connect an S12C emulator system to an MC9S12C family 80-pin QFP target. This set consists of a Tokyo Eletech TQ adapter base part # ES/000-4534 (TQPACK080SB), a spacer part # ES/000-2870 (TQSOCKET080SBW) and the 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12C/ADP-TQ-80-Set**

Emulator to Target Adapters and Accessories (Continued)

HCS12 C Family Adapter Sets (C32, C64, C96 and C128) (continued)

HCS12 C Family Flex Cable Adapter Sets

S12C 48-pin NQ Flex cable set	A 48-pin flex cable set made by Nohau. This set contains the required components to con-nect an S12C emulator system to an MC9S12C family 48-pin QFP target using a flex cable. This set consists of a solder-down NQ adapter base part# ES/000-2075 (NQPACK048SD), a microcontroller cover (HQ) part # ES/000-2076 (HQPACK048SD), an emulator cover (YQ) part# ES/000-2077 (YQPACK048SD), a spacer part # ES/000-3574 (YQSOCKET048SDF), a flex cable part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and an 48-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12C/ADP-TOP-PCB-48 and ADP/BOT-PCB-QFP48-050.	**EMUL-S12C/ADP-FLEX-NQ-48-Set**
S12C 48-pin TQ Flex cable set	A 48-pin flex cable set made by Nohau. This set contains the required components to connect an S12C emulator system to an MC9S12C family 48-pin QFP target using a flex cable. This set consists of a solder-down TQ adapter base part# ES/000-4468 (TQPACK 048SD), a spacer part # ES/000-2726 (YQSOCKET048SDG), a flex cable part # EMUL/ADP /FLEX-CABLE/MALE-FEMALE and an 48-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12C/ADP-TOP-PCB-48 and ADP/BOT-PCB-QFP48-050.	**EMUL-S12C/ADP-FLEX-TQ-48-Set**
S12C 52-pin NQ Flex cable set	A 52-pin flex cable set made by Nohau. This set contains the required components to connect an S12C emulator system to an MC9S12C family 52-pin QFP target using a flex cable. This set consists of a solder-down NQ adapter base part# ES/000-2085 (NQPACK052SB), a microcontroller cover (HQ) part # ES/000-2086 (HQPACK052SB), an emulator cover (YQ) part# ES/000-2087 (YQPACK052SB), a spacer part # ES/000-3588 (YQSOCKET052SBF), a flex cable part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and an 52-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12C/ADP-TOP-PCB-52 and ADP/BOT-PCB-QFP52-065.	**EMUL-S12C/ADP-FLEX-NQ-52-Set**
S12C 52-pin TQ Flex cable set	A 52-pin flex cable set made by Nohau. This set contains the required components to connect an S12C emulator system to an MC9S12C family 52-pin QFP target using a flex cable. This set consists of a solder-down TQ adapter base part# ES/000-4472 (TQPACK 052SB), a spacer part # ES/000-2756 (YQSOCKET052SBW), a flex cable part # EMUL/ ADP/FLEX-CABLE/MALE-FEMALE and an 52-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12C/ADP-TOP-PCB-52 and ADP/BOT-PCB-QFP52-065.	**EMUL-S12C/ADP-FLEX-TQ-52-Set**
S12C 80-pin NQ Flex cable set	A 80-pin flex cable set made by Nohau. This set contains the required components to connect an S12C emulator system to an MC9S12C family 80-pin QFP target using a flex cable. This set consists of a solder-down NQ adapter base part# ES/000-2177 (NQPACK 080SB), a microcontroller cover (HQ) part # ES/000-2178(HQPACK080SB), an emulator cover (YQ) part# ES/000-2179 (YQPACK080SB), a spacer part # ES/000-3660 (YQSOCKET080SBF), a flex cable part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and an 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12C/ADP-FLEX-NQ-80-Set**
S12C 80-pin TQ Flex cable set	A 80-pin flex cable set made by Nohau. This set contains the required components to connect an S12C emulator system to an MC9S12C family 80-pin QFP target using a flex cable. This set consists of a solder-down TQ adapter base part# ES/000-4534 (TQPACK 080SB), a spacer part # ES/000-2870 (YQSOCKET080SBW), a flex cable part # EMUL/ ADP/FLEX-CABLE/MALE-FEMALE and an 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12C/ADP-FLEX-TQ-80-Set**

Emulator to Target Adapters and Accessories (Continued)

HCS12 K, D, B and A Family Adapter Sets Selection Chart (MC9S12 KT256, KG256, KG128, K64, K32, DP512, DT512, DJ512, DP256, KT256, DJ256, DG256, DT128, DJ128, DG128, DB128, DJ64, D64, D32, B256, B128, B64, A512, A256, A128, A64 and A32)

	80 Pin	112 Pin
NQ Adapter Base Set	EMUL-S12D/ADP-80SD-NQ-Set Price:	EMUL-S12D/ADP-112SD-NQ-Set Price:
TQ Adapter Base Set	EMUL-S12D/ADP-80SD-TQ-Set Price:	EMUL-S12D/ADP-112SD- TQ-Set Price:
NQ Adapter Base + Flex Cable Set	EMUL-S12D/ADP-FLEX-NQ-80-Set Price:	EMUL-S12D/ADP-FLEX-NQ-112-Set Price:
TQ Adapter Base + Flex Cable Set	EMUL-S12D/ADP-FLEX-TQ-80-Set Price:	EMUL-S12D/ADP-FLEX-TQ-112-Set Price:

HCS12 K, D, B and A Family Plain Adapter Sets Component Chart

Pin Count	Adapter Set	Parts that make up the set and can be purchased separately			
		NQ or TQ Adapter Base	**HQ Microcontroller Cover**	**YQ Emulator Cover**	**NQ or TQ Spacer**
80-Pin NQ	EMUL-S12D/ADP-80SD-NQ-Set Price:	ES/000-2177 Price:	ES/000-2178 Price:	ES/000-2179 Price:	ES/000-3660 Price:
80-Pin TQ	EMUL-S12D/ADP-80SD-TQ-Set Price:	ES/000-4534 Price:			ES/000-2870 Price:
112-Pin NQ	EMUL-S12D/ADP-112SD-NQ-Set Price:	ES/000-2240 Price:	ES/000-2241 Price:	ES/000-2242 Price:	ES/000-3720 Price:
112-Pin TQ	EMUL-S12D/ADP-112SD-TQ-Set Price:	ES/000-4584 Price:			ES/000-2970 Price:

Emulator to Target Adapters and Accessories (Continued)

HCS12 K, D, B and A Family Adapter Flex Cable Sets Component Chart

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement Adapter TQ or NQ/HQ/YQ	Replacement Spacer	Replacement Rotational Boards
80-Pin NQ	EMUL-S12D/ADP-FLEX-NQ-80-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2177/9/8	ES/000-3660	EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065
80-Pin TQ	EMUL-S12D/ADP-FLEX-TQ-80-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4534	ES/000-2870	EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065
112-Pin NQ	EMUL-S12D/ADP-FLEX-NQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2240/1/2	ES/000-3720	EMUL-S12D/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065
112-Pin TQ	EMUL-S12D/ADP-FLEX-TQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4584	ES/000-2970	EMUL-S12D/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065

Emulator to Target Adapters and Accessories (Continued)

HCS12 K, D, B and A Family Adapter Sets (MC9S12 KT256, KG256, KG128, K64, K32, DP512, DT512, DJ512, DP256, KT256, DJ256, DG256, DT128, DJ128, DG128, DB128, DJ64, D64, D32, B256, B128, B64, A512, A256, A128, A64 and A32)

HCS12 K, D, B and A Family Plain Adapter Sets (no flex cable)

S12K/D/B/A 80-pin NQ adapter set	This adapter set contains the required components to connect an "S12D" or "S12" motherboard to an MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx target using an 80-pin QFP solder-down adapter. This set consists of a Tokyo Eletech NQ adapter base part # ES/000-2177, microcontroller cover (HQ) part # ES/000-2178, emulator cover (YQ) part # ES/000-2179, spacer part # ES/000-3660 and the 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12D/ADP-80SD-NQ-Set**
S12K/D/B/A 80-pin TQ adapter set	This adapter set contains the required components to connect an "S12D" or "S12" motherboard to an MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx target using an 80-pin QFP solder-down adapter. This set consists of a Tokyo Eletech TQ adapter base part # ES/000-4534, a spacer part # ES/000-2870 and the 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12D/ADP-80SD-TQ-Set**
S12K/D/B/A 112-pin NQ adapter set	This adapter set contains the required components to connect an "S12D" or "S12" motherboard to an MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx target using a 112-pin QFP solder-down adapter. This set consists of a Tokyo Eletech NQ adapter base part # ES/000-2240, a microcontroller cover (HQ) part # ES/000-2241, an emulator cover (YQ) part # ES/000-2242, a spacer part # ES/000-3720 and the 112-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12D/ADP-112SD-NQ-Set**
S12K/D/B/A 112-pin TQ adapter set	This adapter set contains the required components to connect an "S12D" or "S12" motherboard to an MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx target using a 112-pin QFP solder-down adapter. This set consists of a Tokyo Eletech TQ adapter base part # ES/000-4584, a spacer part # ES/000-2970 and the 112-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12D/ADP-112SD-TQ-Set**

Emulator to Target Adapters and Accessories (Continued)

HCS12 K, D, B and A Family Adapter Sets (continued)

HCS12 K, D, B and A Family Flex Cable Adapter Sets

S12K/D/B/A 80-pin NQ Flex cable set	An 80-pin flex cable set made by Nohau. This set consists of a solder-down NQ adapter base part# ES/000-2177, a microcontroller cover (HQ) part # ES/000-2178, an emulator cover (YQ) part# ES/000-2179, a spacer part # ES/000-3660, a flex cable part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and an 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065. This set contains the required components to connect an "S12D" or "S12" motherboard to an MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx 80-pin QFP target.	**EMUL-S12D/ADP-FLEX-NQ-80-Set**
S12K/D/B/A 80-pin TQ Flex cable set	An 80-pin flex cable set made by Nohau. This set consists of a solder-down TQ adapter base part# ES/000-4534, a spacer part # ES/000-2870, a flex cable part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and the 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065. This set contains the required components to connect an "S12D" or "S12" motherboard to an MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx 80-pin QFP target.	**EMUL-S12D/ADP-FLEX-TQ-80-Set**
S12K/D/B/A 112-pin NQ Flex cable set	A 112-pin flex cable set made by Nohau. This set consists of a solder-down NQ adapter base part# ES/000-2240, a microcontroller cover (HQ) part # ES/000-2241, an emulator cover (YQ) part# ES/000-2242, a spacer part # ES/000-3720, a flex cable part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and the 112-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065. This set contains the required components to connect an "S12D" or "S12" motherboard to an MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx 112-pin QFP target.	**EMUL-S12D/ADP-FLEX-NQ-112-Set**
S12K/D/B/A 112-pin TQ Flex cable set	A 112-pin flex cable set made by Nohau. This set consists of a solder-down TQ adapter base part# ES/000-4584, a spacer part # ES/000-2970, a flex cable part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and the 112-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12D/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065. This set contains the required components to connect an "S12D" or "S12" motherboard to an MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx 112-pin QFP target.	**EMUL-S12D/ADP-FLEX-TQ-112-Set**

Emulator to Target Adapters and Accessories (Continued)

HCS12 E Family Adapter Sets Selection Chart (MC9S12 E256, E128, E64 and E32)

	112 Pin	80 Pin
NQ Adapter Base Set	EMUL-S12E/ADP-NQ-112-Set	EMUL-S12E/ADP-NQ-80-Set
TQ Adapter Base Set	EMUL-S12E/ADP-TQ-112-Set	EMUL-S12E/ADP-TQ-80-Set
NQ Adapter Base + Flex cable Set	EMUL-S12E/ADP-FLEX-NQ-112-Set	EMUL-S12E/ADP-FLEX-NQ-80-Set
TQ Adapter Base + Flex cable Set	EMUL-S12E/ADP-FLEX-TQ-112-Set	EMUL-S12E/ADP-FLEX-TQ-80-Set

HCS12 E Family (E256, E128, E64 and E32) Plain Adapter Sets Component Chart

Pin Count	Adapter Set	Parts that make up the set and can be purchased separately			
		NQ or TQ Adapter Base	HQ Microcontroller Cover	YQ Emulator Cover	NQ or TQ Spacer
80-Pin NQ	EMUL-S12E/ADP- NQ-80-Set Price:	ES/000-2177 Price:	ES/000-2178 Price:	ES/000-2179 Price:	ES/000-3660 Price:
80-Pin TQ	EMUL-S12E/ADP-TQ-80-Set Price:	ES/000-4534 Price:			ES/000-2870 Price:
112-Pin NQ	EMUL-S12E/ADP-NQ-112-Set Price:	ES/000-2240 Price:	ES/000-2241 Price:	ES/000-2242 Price:	ES/000-3720 Price:
112-Pin TQ	EMUL-S12E/ADP-TQ-112-Set Price:	ES/000-4584 Price:			ES/000-2970 Price:

HCS12 E Family (E256, E128, E64 and E32) Adapter Flex Cable Sets Component Chart

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement Adapter TQ or NQ/HQ/YQ	Replacement Spacer	Replacement Rotational Boards
80-Pin NQ	EMUL-S12E/ADP-FLEX-NQ-80-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2177/9/8	ES/000-3660	EMUL-S12E/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065
80-Pin TQ	EMUL-S12E/ADP-FLEX-TQ-80-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4534	ES/000-2870	EMUL-S12E/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065
112-Pin NQ	EMUL-S12E/ADP-FLEX-NQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2240/1/2	ES/000-3720	EMUL-S12E/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065
112-Pin TQ	EMUL-S12E/ADP-FLEX-TQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-4584	ES/000-2970	EMUL-S12E/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065

Emulator to Target Adapters and Accessories (Continued)

HCS12 E Family (E256, E128, E64 and E32) Adapter Sets

80-pin NQ adapter set — This set contains the required components to connect an S12E emulator system to an MC9S12E family 80-pin QFP target. This set consists of a solder-down NQ adapter base, part # ES/000-2177 (NQPACK080SB), a microcontroller cover, part # ES/000-2178 (HQPACK080SB), an emulator cover, part # ES/000-2179 (YQPACK080SB), a spacer, part # ES/000-3660 (YQSOCKET080SBF) and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12E/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.

EMUL-S12E/ADP-NQ-80-Set

80-pin TQ adapter set — This set contains the required components to connect an S12E emulator system to an MC9S12E family 80-pin QFP target. This set consists of a solder-down TQ adapter base, part # ES/000-4534 (TQPACK080SB), a spacer, part # ES/000-2870 (TQSOCKET080SBW) and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12E/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.

EMUL-S12E/ADP-TQ-80-Set

112-pin NQ adapter set — This set contains the required components to connect an S12E emulator system to an MC9S12E family 112-pin QFP target. This set consists of a solder-down NQ adapter base, part # ES/000-2240 (NQPACK112SB), a microcontroller cover, part # ES/000-2241 (HQPACK112SB), an emulator cover, part # ES/000-2242 (YQPACK112SB), a spacer, part # ES/000-3720 (YQSOCKET112SBF) and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12E/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.

EMUL-S12E/ADP-NQ-112-Set

112-pin TQ adapter set — This set contains the required components to connect an S12E emulator system to an MC9S12E family 112-pin QFP target. This set consists of a solder-down TQ adapter base, part # ES/000-4584 (TQPACK112SB), a spacer, part # ES/000-2970 (TQSOCKET112SBW) and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12E/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.

EMUL-S12E/ADP-TQ-112-Set

Emulator to Target Adapters and Accessories (Continued)

HCS12 E Family (E256, E128, E64 and E32) Flex Cable Adapter Sets

80-pin NQ flex cable set	An 80-pin flex cable set made by Nohau. This set contains the required components to connect an S12E emulator system to an MC9S12E family 80-pin QFP target using a flex cable. This set consists of a solder-down NQ adapter base, part # ES/000-2177 (NQPACK080SB), a microcontroller cover, part # ES/000-2178 (HQPACK080SB), an emulator cover, part # ES/000-2179 (YQPACK080SB), a spacer, part # ES/000-3660 (YQSOCKET080SBF), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12E/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12E/ADP-FLEX-NQ-80-Set**
80-pin TQ flex cable set	A 80-pin flex cable set made by Nohau. This set contains the required components to connect an S12E emulator system to an MC9S12E family 80-pin QFP target using a flex cable. This set consists of a solder-down TQ adapter base, part # ES/000-4534 (TQPACK080SB), a spacer, part # ES/000-2870 (TQSOCKET080SBW), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and the 80-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12E/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-065.	**EMUL-S12E/ADP-FLEX-TQ-80-Set**
112-pin NQ flex cable set	A 112-pin flex cable set made by Nohau. This set contains the required components to connect an S12E emulator system to an MC9S12E family 112-pin QFP target using a flex cable. This set consists of a solder-down NQ adapter base, part # ES/000-2240 (NQPACK112SB), a microcontroller cover, part # ES/000-2241 (HQPACK112SB), an emulator cover, part # ES/000-2242 (YQPACK112SB), a spacer, part # ES/000-3720 (YQSOCKET112SBF), a flex cable, part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12E/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12E/ADP-FLEX-NQ-112-Set**
112-pin TQ flex cable set	A 112-pin flex cable set made by Nohau. This set contains the required components to connect an S12E emulator system to an MC9S12E family 112-pin QFP target using a flex cable. This set consists of a solder-down TQ adapter base, part # ES/000-4584 (TQPACK112SB), a spacer, part # ES/000-2970 (TQSOCKET112SBW), a flex cable part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and the 112-pin top (emulator end) and bottom (target end) rotational boards, part # EMUL-S12E/ADP-TOP-PCB-112 and ADP/BOT-PCB-QFP112-065.	**EMUL-S12E/ADP-FLEX-TQ-112-Set**

Emulator to Target Adapters and Accessories (Continued)

For the HCS12 H family, Nohau does not offer plain adapter sets at this time.

HCS12 H Family Adapter Flex Cable Sets Selection Chart (H256, H128 and H64)

	112 Pin	144 Pin
NQ Adapter Base + Flex Cable Set	EMUL-S12H/ADP-FLEX-NQ-112-Set Price:	EMUL-S12H/ADP-FLEX-NQ-144-Set Price:
TQ Adapter Base + Flex Cable Set	EMUL-S12H/ADP-FLEX-TQ-112-Set Price:	EMUL-S12H/ADP-FLEX-TQ-144-Set Price:

HCS12 H Family Adapter Flex Cable Sets Component Chart (H256, H128 and H64)

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement Adapter TQ or NQ/YQ/HQ	Replacement Spacer	Replacement Rotational Boards
112-Pin NQ	EMUL-S12H/ADP-FLEX-NQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX/UNIV	ES/000-2240/1/2	ES/000-4584	EMUL-S12D/ADP-S12-112HD
112-Pin TQ	EMUL-S12H/ADP-FLEX-TQ-112-Set Price:	Nohau Flex	EMUL/ADP/FLEX/UNIV	ES/000-4584	ES/000-2970	EMUL-S12D/ADP-S12-112HD
144-Pin NQ	EMUL-S12H/ADP-FLEX-NQ-144-Set Price:	Nohau Flex	EMUL/ADP/FLEX/UNIV	ES/000-2303/4/5	ES/000-3776	EMUL-S12D/ADP-S12-144HD
144-Pin TQ	EMUL-S12H/ADP-FLEX-TQ-144-Set Price:	Nohau Flex	EMUL/ADP/FLEX/UNIV	ES/000-4632	ES/000-3065	EMUL-S12D/ADP-S12-144HD

Emulator to Target Adapters and Accessories (Continued)

HCS12 H Family Flex Cable Adapter Sets

S12H 112-pin NQ Flex cable set	A complete flex cable 112-pin NQ adapter set for MC9S12Hxxx derivatives. Consists of a NQ solder-down base part # ES/000-2240, a microcontroller cover (HQ) part # ES/000-2241, an emulator cover (YQ) part # ES/000-2242, a spacer part # ES/000-3720, a flex cable part # EMUL/ADP/FLEX/UNIV and the 112-pin emulator end and target end rotational boards part # EMUL-S12D/ADP-S12-112HD.	**EMUL-S12H/ADP-FLEX-NQ-112-Set**
S12H 112-pin TQ Flex cable set	A complete flex cable 112-pin TQ adapter set for MC9S12Hxxx derivatives. Consists of a TQ solder-down base part # ES/000-4584, spacer part # ES/000-2970, a flex cable part # EMUL/ADP/FLEX/UNIV and the 112-pin emulator end and target end rotational boards part # EMUL-S12D/ADP-S12-112HD.	**EMUL-S12H/ADP-FLEX-TQ-112-Set**
S12H 144-pin NQ Flex cable set	A complete flex cable 144-pin NQ adapter set for MC9S12Hxxx derivatives. Consists of a NQ solder-down base part # ES/000-2303, a microcontroller cover (HQ) part # ES/000-2304, an emulator cover (YQ) part # ES/000-2305, a spacer part # ES/000-3776, a flex cable part # EMUL/ADP/FLEX/UNIV and the 144-pin emulator end and target end rotational boards part # EMUL-S12D/ADP-S12-144HD.	**EMUL-S12H/ADP-FLEX-NQ-144-Set**
S12H 144-pin TQ Flex cable set	A complete flex cable 144-pin TQ adapter set for MC9S12Hxxx derivatives. Consists of a TQ solder-down base part # ES/000-4632, spacer part # ES/000-3065, a flex cable part # EMUL/ADP/FLEX/UNIV and the 144-pin emulator end and target end rotational boards part # EMUL-S12D/ADP-S12-144HD.	**EMUL-S12H/ADP-FLEX-TQ-144-Set**

Emulator to Target Adapters and Accessories (Continued)

HCS12 T Family Adapter Sets Selection Chart (T64)

	80 Pin
NQ Adapter Base Set	EMUL-S12T/ADP-NQ-80-Set Price:
NQ Adapter Base + Flex Cable Set	EMUL-S12T/ADP-FLEX-NQ-80-Set Price:

HCS12 T Family Plain Adapter Sets Component Chart (T64)

Pin Count	Adapter Set	Parts that make up the set and can be purchased separately			
		NQ Adapter Base	HQ Microcontroller Cover	YQ Emulator Cover	NQ Spacer
80-Pin NQ	EMUL-S12T/ADP-NQ-80-Set Price:	ES/000-2174 Price:	ES/000-2175 Price:	ES/000-2176 Price:	ES/000-3658 Price:

HCS12 T Family Adapter Flex Cable Sets Component Chart (T64)

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement Adapter TQ or NQ/HQ/YQ	Replacement Spacer	Replacement Rotational Boards
80-Pin NQ	EMUL-S12T/ADP-FLEX-NQ-80-Set Price:	Nohau Flex	EMUL/ADP/FLEX-CABLE/MALE-FEMALE	ES/000-2174/5/6	ES/000-3658	EMUL-S12T/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-050

Emulator to Target Adapters and Accessories (Continued)

HCS12 T Family Adapter Sets (T64)

HCS12 T Family Plain Adapter Set (no flex cable)

S12T 80-pin NQ adapter set

This adapter set contains the required components to connect an S12T emulator system to an MC9S12T family 80-pin QFP target. This set consists of a Tokyo Eletech NQ adapter base part # ES/000-2174 (NQPACK080SD), microcontroller cover (HQ) part # ES/000-2175 (HQPACK080SD), emulator cover (YQ) part # ES/000-2176 (YQPACK080SD), spacer part # ES/000-3658 (YQSOCKET080SDF) and the 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12T/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-050.

EMUL-S12T/ADP-NQ-80-Set

HCS12 T Family Flex Cable Adapter Set

S12T 80-pin NQ Flex cable set

An 80-pin flex cable set made by Nohau. This set contains the required components to connect an S12T emulator system to an MC9S12T family 80-pin QFP target using a flex cable. This set consists of a Tokyo Eletech NQ adapter base part # ES/000-2174 (NQPACK080SD), microcontroller cover (HQ) part # ES/000-2175 (HQPACK080SD), emulator cover (YQ) part # ES/000-2176 (YQPACK080SD), spacer part # ES-000-3658 (YQSOCKET080SDF), a flex cable part # EMUL/ADP/FLEX-CABLE/MALE-FEMALE and the 80-pin top (emulator end) and bottom (target end) rotational boards part # EMUL-S12T/ADP-TOP-PCB-80 and ADP/BOT-PCB-QFP80-050.

EMUL-S12T/ADP-FLEX-NQ-80-Set

Emulator to Target Adapters and Accessories (Continued)

HC12 B Family Adapter Sets Selection Chart (B32, BC32, BD32 and BE32)

	80 Pin
NQ Adapter Base Set	ES/180-5550-00-NQ-Set Price:
TQ Adapter Base Set	ES/180-5550-10-TQ-Set Price:
NQ Adapter Base + Flex Cable Set	N/A
TQ Adapter Base + Flex Cable Set	EMUL/ADP/FLEX-B80M-Set Price:

HC12 B Family Plain Adapter Sets Component Chart (B32, BC32, BD32 and BE32)

Pin Count	Adapter Set	Parts that make up the set and can be purchased separately			
		NQ or TQ Adapter Base	HQ Microcontroller Cover	YQ Emulator Cover	NQ or TQ Spacer
80-Pin NQ	ES/180-5550-00-NQ-Set Price:	ES/000-2177 Price:	ES/000-2178 Price:	ES/000-2179 Price: 814	ES/000-3660 Price:
80-Pin TQ	ES/180-5550-10-TQ-Set Price:	ES/000-4534 Price:			ES/000-2870 Price:

HC12 B Family Flex Cable Adapter Sets Component Chart (B32, BC32, BD32 and BE32)

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement Adapter TQ	Replacement Spacer	Replacement Rotational Boards
80-Pin TQ	EMUL/ADP/FLEX-B80M-Set Price:	Motorola CABLE	SC1200009	ES/000-4534 Price:	ES/000-2870 Price:	Motorola board

Emulator to Target Adapters and Accessories (Continued)

HC12 B Family Adapter Sets (B32, BC32, BD32 and BE32)

HC12 B Family Plain Adapter Sets (no flex cable)

12B 80-pin NQ adapter set	An 80-pin QFP solder-down adapter set. This set consists of a Tokyo Eletech NQ adapter base part # ES/000-2177, microcontroller cover (HQ) part # ES/000-2178, emulator cover (YQ) part # ES/000-2179, spacer part # ES/000-3660 and an adapter mezzanine board.	**ES/180-5550-00-NQ-Set**
12B 80-pin TQ adapter set	An 80-pin QFP solder-down adapter set. This set consists of a Tokyo Eletech TQ adapter base part # ES/000-4534 and an adapter mezzanine board.	**ES/180-5550-10-TQ-Set**

HC12 B Family Flex Cable Adapter Sets

12B 80-pin TQ Motorola Flex cable set	An 80-pin flex cable set made by Motorola, part # SC1200009. This set consists of a solder-down TQ adapter base part # ES/000-4534, a spacer part # ES/000-2870, a Motorola CBLE and a Motorola emulator end target adapter board.	**EMUL/ADP/FLEX - B80M-Set**

Emulator to Target Adapters and Accessories (Continued)

HC12 D Family Adapter Sets Selection Chart (D60, D60A, DA128, DA128A, DG128, DG128A and DT128A)

	80 Pin	112 Pin
NQ Adapter Base Set	EMUL12-D/ADP-80SD-NQ-Set Price:	EMUL12-D/ADP-112SD-NQ-Set Price:
TQ Adapter Base Set	EMUL12-D/ADP-80SD-TQ-Set Price:	EMUL12-D/ADP-112SD-TQ-Set Price:
NQ Adapter Base + Flex Cable Set	N/A	N/A
TQ Adapter Base + Flex Cable Set	N/A	EMUL/ADP/FLEX-DX-112M-Set Price:

HC12 D Family Plain Adapter Sets Chart

Pin Count	Adapter Set	Parts that make up the set and can be purchased separately			
		NQ or TQ Adapter Base	HQ Microcontroller Cover	YQ Emulator Cover	NQ or TQ Spacer
80-Pin NQ	EMUL12-D/ADP-80SD-NQ-Set Price:	ES/000-2177 Price:	ES/000-2178 Price:	ES/000-2179 Price:	ES/000-3660 Price:
80-Pin TQ	EMUL12-D/ADP-80SD-TQ-Set Price:	ES/000-4534 Price:			N/A
112-Pin NQ	EMUL12-D/ADP-112SD-NQ-Set Price:	ES/000-2240 Price:	ES/000-2241 Price:	ES/000-2242 Price:	ES/000-3720 Price:
112-Pin TQ	EMUL12-D/ADP-112SD-TQ-Set Price:	ES/000-4584 Price:			ES/000-2970 Price:

HC12 D Family Flex Cable Adapter Sets Chart

Pin Count	Flex Cable Set	Flex Cable Type	Flex Cable Part #	Replacement Adapter TQ	Replacement Spacer	Replacement Rotational Boards
112-Pin TQ	EMUL/ADP/FLEX-DX-112M-Set Price:	Motorola Rigid Flex Cable	SC1200012	ES/000-4584	ES/000-2970	Motorola board

Emulator to Target Adapters and Accessories (Continued)

HC12 D Family Adapter Sets (D60, D60A, DA128, DA128A, DG128, DG128A and DT128A)
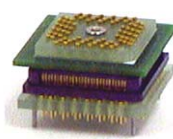
HC12 D Family Plain Adapter Sets (no flex cable)
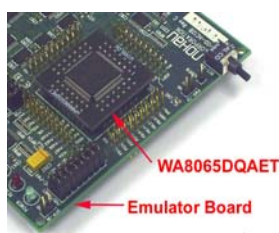
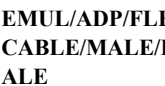|		
12D 80-pin NQ adapter set	An 80-pin adapter set for the D60, D60A, DA128, DA128A, DG128, DG128A and DT128A with the "D" emulator. This set consists of a Tokyo Eletech 80-pin NQ adapter base part # ES/000-2177, microcontroller cover (HQ) part # ES/000-2178, emulator cover (YQ) part # ES/000-2179, spacer part # ES/000-3660, the EMUL-12D/ADP/112P/80P-D60 112-pin to 80-pin adapter and the adapter mezzanine board.	**EMUL12-D/ADP-80SD-NQ-Set**
12D 80-pin TQ adapter set	An 80-pin adapter set for the D60, D60A, DA128, DA128A, DG128, DG128A and DT128A with the "D" emulator. This set consists of a Tokyo Eletech 80-pin TQ adapter base part # ES/000-4534, the EMUL-12D/ADP/112P/80P-D60 112-pin to 80-pin adapter and the adapter mezzanine board.	**EMUL12-D/ADP-80SD-TQ-Set**
12D 112-pin NQ adapter set	A 112-pin adapter set for the D60, D60A, DA128, DA128A, DG128, DG128A and DT128A with the "D" emulator. This set consists of a Tokyo Eletech NQ adapter base part # ES/000-2240, microcontroller cover (HQ) part # ES/000-2241, emulator cover (YQ) part # ES/000-2242, spacer part # ES/000-3720 and the adapter mezzanine board.	**EMUL12-D/ADP-112SD-NQ-Set**
12D 112-pin TQ adapter set	A 112-pin adapter set for the D60, D60A, DA128, DA128A, DG128, DG128A and DT128A with the "D" emulator. This set consists of a Tokyo Eletech TQ adapter base part # ES/000-4584, a spacer part # ES/000-2970 and the adapter mezzanine board.	**EMUL12-D/ADP-112SD-TQ-Set**

HC12 D Family Flex Cable Adapter Sets

12D 112-pin TQ Motorola Flex cable set	A 112-pin flex cable set made by Motorola, part # SC1200012. This set consists of a solder-down TQ adapter base part # ES/000-4584, a spacer part # ES/000-2970, a Motorola Rigid Flex Cable and a Motorola emulator end target adapter board. The flex cable is used to move the emulator away from the target board. The assembly is inserted between the emulator and the adapter. All parts can be purchased separately.	**EMUL/ADP/FLEX-Dx-112M-Set**

Emulator to Target Adapters and Accessories (Continued)

Individual Adapters

112-pin socket

A 112-pin CTI socket that allows a 112-pin HC12 microcontroller chip to be plugged into a target board with an ES/000-4584 solder-down adapter base. The EMUL12-D/ADP-112SD-NQ-Set (listed above) is a more robust solution than this.

ES/210-5726-00

HC12 D 112-pin to 80- pin adapter

This is a converter adapter made by Motorola, part # SC1200027-N. This adapter is used to convert a 112-pin adapter to an 80-pin package for the D60, DA128, DA128A, DG128, or DG128A emulator. This adapter is used with the ES/000-2177/78/79 (NQ) adapter or the ES/000-4534 (TQ) adapter (not included, refer to page 48 for a description).

EMUL-12D/ADP 112P/80P-D60

HC12 B Winslow 80-pin QFP to PGA adapter

A Winslow 80-pin QFP to PGA adapter. This adapter is an unpopulated CPU module, that can be used with the EMUL12-B/128-16. Solder a 68HC912B32, 68HC912BC32, 68HC912BE32 or a 68HC912BD32 CPU on this adapter in order to use it as a CPU module.

WA08065DQAET

WA8065DQAET

Emulator Board

Isolator Adapter

A set of four isolator strips that can be inserted between the pod and the adapter, with individual DIP switches for each pin. This is useful for diagnosing signal conflicts between the pod and the target.

EMUL-PC/ISO-160

Isolator

Motorola parts can be ordered through Micro Logic, Inc. directly by calling (248) 673-0144.

* **Nohau Male-Female Flex Cable**

A Nohau 10-inch flex cable with male connectors on one end and female connectors on the opposite end. It requires the 80 or 112-pin top (emulator end) rotational board and the bottom (target end) rotational board listed below.

EMUL/ADP/FLEX-CABLE/MALE/FEMALE

Individual Rotational Boards

S12X E, D, B and A Family Rotational Boards

S12X E/D/B/A Top emulator end 80-pin rotational board	The top emulator end rotational board for the 80-pin adapters used for the S12XD and S12XE families. This board connects to the bottom of the EMUL-S12X emulator. The four headers on the bottom plug into either the 80-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP80-065) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12XD/ ADP-TOP-PCB-80**
S12X E/D/B/A Top emulator end 112-pin rotational board	The top emulator end rotational board for the 112-pin adapters used for the S12XD and S12XE families. This board connects to the bottom of the EMUL-S12X emulator. The four headers on the bottom plug into either the 112-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP112-065) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12XD/ ADP-TOP-PCB-112**
S12X E/D/B/A Top emulator end 144-pin rotational board	The top emulator end rotational board for the 144-pin adapters used for the S12XD and S12XE families. This board connects to the bottom of the EMUL-S12X emulator. The four headers on the bottom plug into either the 144-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP144-050) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12XD/ ADP-TOP-PCB-144**
* S12XE Top emulator end 208-pin rotational board	The top emulator end rotational board for the 208-pin adapters used for the S12XE family. This board connects to the bottom of the EMUL-S12X emulator. The four headers on the bottom plug either directly into the 208-pin bottom rotational board (ADP/BOT-PCB/S12XE-BGA208-1MM) to form an adapter, or to the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12XE/ ADP-TOP-PCB-208**
S12X E/D/B/A Bottom target end 80-pin rotational board	The bottom target end rotational board for the QFP 80-pin 0.65mm pitch adapters. This board plugs into a QFP 80-pin 0.65mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 80-pin top rotational board (EMUL-S12XD/ADP-TOP-PCB-80) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/ MALE-FEMALE) to extend the emulator away from the target.	**EMUL/ADP/BOT-PCB/QFP80-065**
S12X E/D/B/A Bottom target end 112-pin rotational board	The bottom target end rotational board for the QFP 112-pin 0.65mm pitch adapters. This board plugs into a QFP 112-pin 0.65mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 112-pin top rotational board (EMUL-S12XD/ADP-TOP-PCB-112) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL/ADP/BOT-PCB/QFP112-065**
S12X E/D/B/A Bottom target end 144-pin rotational board	The bottom target end rotational board for the QFP 144-pin 0.50mm pitch adapters. This board plugs into a QFP 144-pin 0.50mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 144-pin top rotational board (EMUL-S12XD/ADP-TOP-PCB-144) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL/ADP/BOT-PCB/QFP144-050**
* S12XE Bottom target end 208-pin BGA rotational board	The bottom target end rotational board for the S12XE BGA 208-pin 1mm pitch adapter. This board plugs on its bottom side into a 208-pin BGA spacer and the BGA solder-down base, part # ES/030-1127-00 (spacer) and either ES/000-4078-01 (Tin-Lead base) or ES/000-4078-00 (Lead-Free base). The four headers on the top plug into either the 208-pin top rotational board (EMUL-S12XE/ADP-TOP-PCB-208) to form an adapter, or to the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**ADP/BOT-PCB/S12XE-BGA208-1MM**

Individual Rotational Boards (continued)

S12XF Family Rotational Boards

S12XF Top emulator end 64-pin rotational board	The top emulator end rotational board for the 64-pin adapters used for the S12XF family. This board connects to the bottom of the EMUL-S12X emulator. The four headers on the bottom plug into either the 64-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP64-050) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	220.00	**EMUL-S12XF/ ADP-TOP-PCB-64**
S12XF Top emulator end 80-pin rotational board	The top emulator end rotational board for the 80-pin adapters used for the S12XF family. This board connects to the bottom of the EMUL-S12X emulator. The four headers on the bottom plug into either the 80-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP80-065) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	220.00	**EMUL-S12XF/ ADP-TOP-PCB-80**
S12XF Top emulator end 112-pin rotational board	The top emulator end rotational board for the 112-pin adapters used for the S12XF family. This board connects to the bottom of the EMUL-S12X emulator. The four headers on the bottom plug into either the 112-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP112-065) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	220.00	**EMUL-S12XF/ ADP-TOP-PCB-112**
S12XF Top emulator end 144-pin rotational board	The top emulator end rotational board for the 144-pin adapters used for the S12XF family. This board connects to the bottom of the EMUL-S12X emulator. The four headers on the bottom plug into either the 144-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP144-050) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	220.00	**EMUL-S12XF/ ADP-TOP-PCB-144**
S12XF Bottom target end 64-pin rotational board	The bottom target end rotational board for the QFP 64-pin 0.50mm pitch adapters. This board plugs into a QFP 64-pin 0.50mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 64-pin top rotational board (EMUL-S12XF/ADP-TOP-PCB-64) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.		**EMUL/ADP/BOT-PCB/QFP64-050**
S12XF Bottom target end 80-pin rotational board	The bottom target end rotational board for the QFP 80-pin 0.65mm pitch adapters. This board plugs into a QFP 80-pin 0.65mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 80-pin top rotational board (EMUL-S12XF/ADP-TOP-PCB-80) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/ MALE-FEMALE) to extend the emulator away from the target.		**EMUL/ADP/BOT-PCB/QFP80-065**
S12XF Bottom target end 112-pin rotational board	The bottom target end rotational board for the QFP 112-pin 0.65mm pitch adapters. This board plugs into a QFP 112-pin 0.65mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 112-pin top rotational board (EMUL-S12XF/ADP-TOP-PCB-112) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.		**EMUL/ADP/BOT-PCB/QFP112-065**
S12XF Bottom target end 144-pin rotational board	The bottom target end rotational board for the QFP 144-pin 0.50mm pitch adapters. This board plugs into a QFP 144-pin 0.50mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 144-pin top rotational board (EMUL-S12XF/ADP-TOP-PCB-144) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.		**EMUL/ADP/BOT-PCB/QFP144-050**

Individual Rotational Boards (continued)

HCS12 C Family Rotational Boards

S12C Top emulator end 48-pin rotational board	The top emulator end rotational board for the 48-pin adapters used for the MC9S12C. This board connects to the bottom of the EMUL-S12 emulator. The four headers on the bottom plug into either the 48-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP48-050) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12C/ADP-TOP-PCB-48**
S12C Top emulator end 52-pin rotational board	The top emulator end rotational board for the 52-pin adapters used for the MC9S12C. This board connects to the bottom of the EMUL-S12 emulator. The four headers on the bottom plug into either the 52-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP52-065) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12C/ADP-TOP-PCB-52**
Bottom target end 48-pin rotational board	The bottom target end rotational board for the QFP 48-pin 0.50mm pitch adapters. Used to support the S12C family. This board plugs into a QFP 48-pin 0.50mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 48-pin top rotational board (EMUL-S12C/ADP-TOP-PCB-48) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/ MALE-FEMALE) to extend the emulator away from the target.	**EMUL/ADP/BOT-PCB/QFP48-050**
Bottom target end 52-pin rotational board	The bottom target end rotational board for the QFP 52-pin 0.65mm pitch adapters. Used to support the S12C family. This board plugs into a QFP 52-pin 0.65mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 52-pin top rotational board (EMUL-S12C/ADP-TOP-PCB-52) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/ MALE-FEMALE) to extend the emulator away from the target.	**EMUL/ADP/BOT-PCB/QFP52-065**

Individual Rotational Boards (continued)

HCS12 K, D, B and A Family Rotational Boards

S12K/D/B/A Top emulator end 80-pin rotational board	The top emulator end rotational board for the 80-pin adapters used for the MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx. This board connects to the bottom of the EMUL-S12 or EMUL-S12D emulator. The four headers on the bottom plug into either the 80-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP80-065) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12D/ADP-TOP-PCB-80**
S12K/D/B/A Top emulator end 112-pin rotational board	The top emulator end rotational board for the 112-pin adapters used for the MC9S12DP256, Axxx, Bxxx, Dxxxx and Kxxxx. This board connects to the bottom of the EMUL-S12 or EMUL-S12D emulator. The four headers on the bottom plug into either the 112-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP112-065) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12D/ADP-TOP-PCB-112**
S12K/D/B/A Bottom target end 80-pin rotational board	The bottom target end rotational board for the QFP 80-pin 0.65mm pitch adapters. This board plugs into a QFP 80-pin 0.65mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 80-pin top rotational board (EMUL-S12D/ADP-TOP-PCB-80) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/ MALE-FEMALE) to extend the emulator away from the target.	**EMUL/ADP/BOT-PCB/QFP80-065**
S12K/D/B/A Bottom target end 112-pin rotational board	The bottom target end rotational board for the QFP 112-pin 0.65mm pitch adapters. This board plugs into a QFP 112-pin 0.65mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 112-pin top rotational board (EMUL-S12D/ADP-TOP-PCB-112) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL/ADP/BOT-PCB/QFP112-065**

Individual Rotational Boards (continued)

HCS12 E Family Rotational Boards (MC9S12 E256, E128, E64 and E32)

HCS12 E Top emulator end 80-pin rotational board	The top emulator end rotational board for the 80-pin adapters used for the MC9S12E128. This board connects to the bottom of the EMUL-S12 emulator. The four headers on the bottom plug into either the 80-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP80-065) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12E/ADP-TOP-PCB-80**
HCS12 E Top emulator end 112-pin rotational board	The top emulator end rotational board for the 112-pin adapters used for the MC9S12E128. This board connects to the bottom of the EMUL-S12 emulator. The four headers on the bottom plug into either the 112-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP112-065) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12E/ADP-TOP-PCB-112**
HCS12 E Bottom target end 80-pin rotational board	The bottom target end rotational board for the QFP 80-pin 0.65mm pitch adapters. This board plugs into a QFP 80-pin 0.65mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 80-pin top rotational board (EMUL-S12D/ADP-TOP-PCB-80) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/ MALE-FEMALE) to extend the emulator away from the target.	**EMUL/ADP/BOT-PCB/QFP80-065**
HCS12 E Bottom target end 112-pin rotational board	The bottom target end rotational board for the QFP 112-pin 0.65mm pitch adapters. This board plugs into a QFP 112-pin 0.65mm pitch Tokyo Eletech solder-down TQ or NQ base. The four headers on the top plug into either the 112-pin top rotational board (EMUL-S12D/ADP-TOP-PCB-112) to form an adapter, or it can be used with the flex cable (EMUL/ADP/FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL/ADP/BOT-PCB/QFP112-065**

Individual Rotational Boards (continued)

HCS12 H Family Rotational Boards

To try and help distinguish the rotational boards we have added "HD", "T" and an "EE" to the part numbers listed below. Please note that "HD" stands for H256, "T" stands for target and "EE" stands for emulator end.

Nohau 10-inch flex cable	A Nohau 10-inch flex cable to extended adapter away from the emulator board. Requires rotational board pair (EMUL-S12D/ADP-S12-112HD or -144HD) for connection at each end.	**EMUL/ADP/FLEX/UNIV**
H256 pair of 112-pin rotational boards	Pair of two rotational boards for the 112-pin H256 that mates to the Nohau flex cable part number EMUL/ADP/FLEX/UNIV (listed above). The two included rotational boards are: EMUL-S12D/ADP-S12-112HD-T and EMUL-S12D/ADP-S12-HD-EE, listed below.	**EMUL-S12D/ADP-S12-112HD**
H256 144-pin pair of rotational boards	Pair of two rotational boards for the 144-pin H256 that mates to the Nohau flex cable part number EMUL/ADP/FLEX/UNIV (listed above). The two included rotational boards are: EMUL-S12D/ADP-S12-144HD-T and EMUL-S12D/ADP-S12-HD-EE listed below.	**EMUL-S12D/ADP-S12-144HD**
H256 target end 112-pin rotational board	This is the rotational board that connects the Nohau flex cable to the 112-pin target and is half of the 112-pin pair listed above. The purpose of this board is to add 112-pin capability to the 144-pin rotational board pair listed above. This is made by Motorola and their part number is M68TAS12HHNTE-10.	**EMUL-S12D/ADP-S12-112HD-T**
H256 target end 144-pin rotational board	This is the rotational board that connects the Nohau flex cable to the 144-pin target and is half of the 144-pin pair listed above. The purpose of this board is to add 144-pin capability to the 112-pin rotational board pair listed above. This is made by Motorola and their part number is M68TA144NTE-10.	**EMUL-S12D/ADP-S12-144HD-T**
H256 Replacement rotational board - emulator end	Replacement rotational board for the emulator end. It is included with the purchase of part numbers EMUL-S12D/ADP-S12-112HD or EMUL-S12D/ADP-S12-144HD, listed above. This is made by Motorola and their part number is M68PPBS12HN-10.	**EMUL-S12D/ADP-S12-HD-EE**

HCS12 T Family Rotational Boards

S12T Top emulator end 80-pin rotational board	The top emulator end rotational board for the 80-pin targets used for the MC9S12T64. This board connects to the bottom of the EMUL-S12 emulator. The four headers on the bottom plug into either the 80-pin bottom rotational board (EMUL/ADP/BOT-PCB/QFP80-050) to form an adapter, or it can be used with the flex cable (EMUL/ADP/ FLEX-CABLE/MALE-FEMALE) to extend the emulator away from the target.	**EMUL-S12T/ADP-TOP-PCB-80**
S12T bottom 80-pin rotation board	Universal bottom rotational adapter board for QFP 80-pin, 0.50mm pitch. Supports the S12T family.	**ADP/BOT-PCB/QFP80-050**

HC12 B and D Family Rotational Boards

These rotational boards are made by Motorola and can be ordered directly from Motorola or through Micro Logic, Inc. directly by calling (248) 673-0144.

Emulator to Target Adapters and Accessories (Continued)

48-pin Replacement Adapter Components

48-pin NQ adapter base	A replacement 48-pin solder-down adapter NQ base (NQPACK048SD).	ES/000-2075
48-pin HQ CPU cover	A replacement 48-pin solder-down adapter NQ microcontroller cover (HQPACK048SD).	ES/000-2076
48-pin YQ emulator cover	A replacement 48-pin solder-down adapter NQ emulator cover (YQPACK048SD).	ES/000-2077
48-pin NQ spacer	A replacement 48-pin NQ spacer between the solder-down base and the adapter PCB (YQSOCKET048SDF). Used for the ES/000-2075/76/77.	ES/000-3574
48-pin TQ adapter base	A replacement 48-pin solder-down TQ adapter base (TQPACK048SD).	ES/000-4468
48-pin TQ spacer	A replacement 48-pin TQ spacer between the solder-down base and the adapter PCB (YQSOCKET048SDG).	ES/000-2726

52-pin Replacement Adapter Components

52-pin NQ adapter base	A replacement 52-pin solder-down adapter NQ base (NQPACK052SB).	ES/000-2085
52-pin HQ CPU cover	A replacement 52-pin solder-down adapter NQ microcontroller cover (HQPACK052SB).	ES/000-2086
52-pin YQ emulator cover	A replacement 52-pin solder-down adapter NQ emulator cover (YQPACK052SB).	ES/000-2087
52-pin NQ spacer	A replacement 52-pin NQ spacer between the solder-down base and the adapter PCB (YQSOCKET052SBF). Used for the ES/000-2085/86/87.	ES/000-3588
52-pin TQ adapter base	A replacement 52-pin solder-down TQ adapter base (TQPACK052SB).	ES/000-4472
52-pin TQ spacer	A replacement 52-pin TQ spacer between the solder-down base and the adapter PCB (YQSOCKET052SBW).	ES/000-2756

Emulator to Target Adapters and Accessories (Continued)

64-pin Replacement Adapter Components

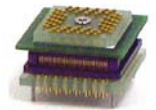|		
* 64-pin NQ adapter base	A replacement 64-pin solder-down adapter NQ base (NQPACK064SD).	**ES/000-2105**
* 64-pin HQ CPU cover	A replacement 64-pin solder-down adapter NQ microcontroller cover (HQPACK064SD).	**ES/000-2106**
* 64-pin YQ emulator cover	A replacement 64-pin solder-down adapter NQ emulator cover (YQPACK064SD).	**ES/000-2107**
* 64-pin NQ spacer	A replacement 64-pin NQ spacer between the solder-down base and the adapter PCB (YQSOCKET064SDF). Used for the above ES/000-2105/06/07.	**ES/000-3610**
* 64-pin TQ adapter base	A replacement 64-pin solder-down TQ adapter base (TQPACK064SD).	**ES/000-4492**
* 64-pin TQ spacer	A replacement 64-pin TQ spacer between the solder-down base and the adapter PCB (YQSOCKET064SDW).	**ES/000-2786**

80-pin Replacement Adapter Components

S12T 80-pin NQ adapter base	An S12T replacement 80-pin solder-down adapter NQ base (NQPACK080SD).	**ES/000-2174**
S12T 80-pin HQ CPU cover	An S12T replacement 80-pin solder-down adapter NQ microcontroller cover (HQPACK080SD).	**ES/000-2175**
S12T 80-pin YQ emulator cover	An S12T replacement 80-pin solder-down adapter NQ emulator cover (YQPACK052SD).	**ES/000-2176**
S12T 80-pin NQ spacer	A replacement 80-pin NQ spacer between the solder-down base and the adapter PCB (YQSOCKET052SDF). Used for the ES/000-2174/75/76.	**ES/000-3588**

Emulator to Target Adapters and Accessories (Continued)

80-pin Replacement Adapter Components (continued)

80-pin NQ adapter base	A replacement 80-pin solder-down adapter NQ base (NQPACK080SB).	**ES/000-2177**
80-pin HQ CPU cover	A replacement 80-pin solder-down adapter NQ microcontroller cover (HQPACK080SB).	**ES/000-2178**
80-pin YQ emulator cover	A replacement 80-pin solder-down adapter NQ emulator cover (YQPACK080SB).	**ES/000-2179**
Complete 80-pin NQ solder-down	This part consists of the NQ 80-pin solder-down adapter base (NQPACK080SB), the emulator cover (YQPACK080SB) and the microcontroller cover (HQPACK080SB).	**ES/000-2177/78/79**
80-pin NQ spacer	A replacement 80-pin NQ spacer between the solder-down base and the adapter PCB (YQSOCKET080SBF). Used for the ES/000-2177/78/79.	**ES/000-3660**
80-pin TQ adapter base	A replacement 80-pin solder-down TQ adapter base (TQPACK080SB).	**ES/000-4534**
80-pin TQ spacer	A replacement 80-pin TQ spacer between the solder-down base and the adapter PCB (TQSOCKET080SBW). Used for the ES/000-4534 adapter.	**ES/000-2870**
112- pin to 80-pin adapter	This is a converter adapter made by Motorola, part # SC1200027-N. This adapter is used to convert a 112-pin adapter to an 80-pin package for the D60, DA128, DA128A, DG128, or DG128A emulator. This adapter is used with the ES/000-2177/78/79 (NQ) adapter or the ES/000-4534 (TQ) adapter.	**EMUL-12D/ADP 112P/80P-D60**

112-pin Replacement Adapter Components

112-pin NQ adapter base	A replacement 112-pin NQ solder-down adapter base (NQPACK112SB).	**ES/000-2240**
112-pin HQ CPU cover	A replacement 112-pin NQ microcontroller cover (HQPACK112SB)).	**ES/000-2241**
112-pin YQ emulator cover	A replacement 112-pin NQ emulator cover (YQPACK112SB)).	**ES/000-2242**
112-pin NQ spacer	A replacement 112-pin NQ spacer (YQSOCKET112SBF). Used for the ES/000-2240/41/42 adapter.	**ES/000-3720**
112-pin TQ adapter base	A replacement 112-pin QFP TQ solder-down adapter base (TQPACK112SB).	**ES/000-4584**
112-pin TQ spacer	A replacement 112-pin TQ spacer (TQSOCKET112SBW).	**ES/000-2970**

Emulator to Target Adapters and Accessories (Continued)

144-pin Replacement Adapter Components

144-pin NQ adapter base	A replacement 144-pin NQ solder-down adapter base 0.5mm pitch (NQPACK144SD).	**ES/000-2303**
144-pin HQ CPU cover	A replacement 144-pin NQ microcontroller cover (HQPACK144SD).	**ES/000-2304**
144-pin YQ emulator cover	A replacement 144-pin NQ emulator cover (YQPACK144SD).	**ES/000-2305**
144-pin NQ spacer	A replacement 144-pin NQ spacer (YQSOCKET144SDF). Used for the ES/000-2303/4/5 adapter.	**ES/000-3776**
144-pin TQ adapter base	A replacement 144-pinTQ solder-down adapter base 0.5mm pitch (TQPACK144SD).	**ES/000-4632**
144-pinTQ spacer	A replacement 144-pin TQ spacer with 3mm guide pins (TQSOCKET144SDG).	**ES/000-3065**

208-pin BGA Replacement Adapter Components

* 208-pin Tin-Lead BGA adapter base	A replacement 208-pin BGA solder-down base with Tin-Lead solder-spheres (non-RoHS Compliant). This Tin-Lead adapter base requires traditional Tin-Lead BGA assembly temperature and assembly process.	**ES/000-4078-01**
* 208-pin Lead-Free BGA adapter base	A replacement 208-pin BGA solder-down base with Lead-Free SAC305 solder-spheres (RoHS Compliant). This Lead-Free adapter base requires higher-temperature Lead-Free BGA assembly process.	**ES/000-4078-00**
* 208-pin BGA IC adapter	A replacement 208-pin BGA IC adapter, to solder a BGA microcontroller on, and plug into the 208-pin BGA solder-down base, or the 208-pin BGA spacer to test stand-alone or BDM operation with the same physical target board.	**ES/140-1127-00**
* 208-pin BGA spacer	A replacement 208-pin spacer. Used to adapt between the 208-pin BGA solder-down base which plugs on its bottom side, and either the 208-pin BGA bottom rotational board, or the 208-pin BGA IC adapter, which both plug on its top side. Several BGA spacers may be stacked together if greater elevation of the adapter from the traget board is needed (each additional spacer elevates the higher adapter parts by additional 3mm).	**ES/030-1127-00**