TRACE32®

Technical Information

FIRE-166

FIRE Emulator for C166 Family

C161CI
C161K
C161O
C161PI
C161RI
C161S
C161SI
C161V
C161XX
C163
C163-16F
C163-24D
C164CI
C164CL

- Full support for C167 family
- Full support for KEIL, TASKING, COSMIC and GNU compilers
- 40 MHz no-wait-state operation
- Dual-port access for ROM and external bus
- Dual-port access for XRAM
- Shadow-RAM for IRAM and XRAM
- FLASH Programming Support
- Hardware Dequeuing
- Code Coverage
- Trace on internal and local variables
- Selective trace on registers, peripherals and local variables
- Trigger on internal register access, bit, byte, and word variables
- Trace on external and BONDOUT busses, bus and clock cycle trace
- Clip-Over, Solder-On and YAMAICHI adapters
- Support of all derivatives, also non-public versions
- Compatible ROM Monitor

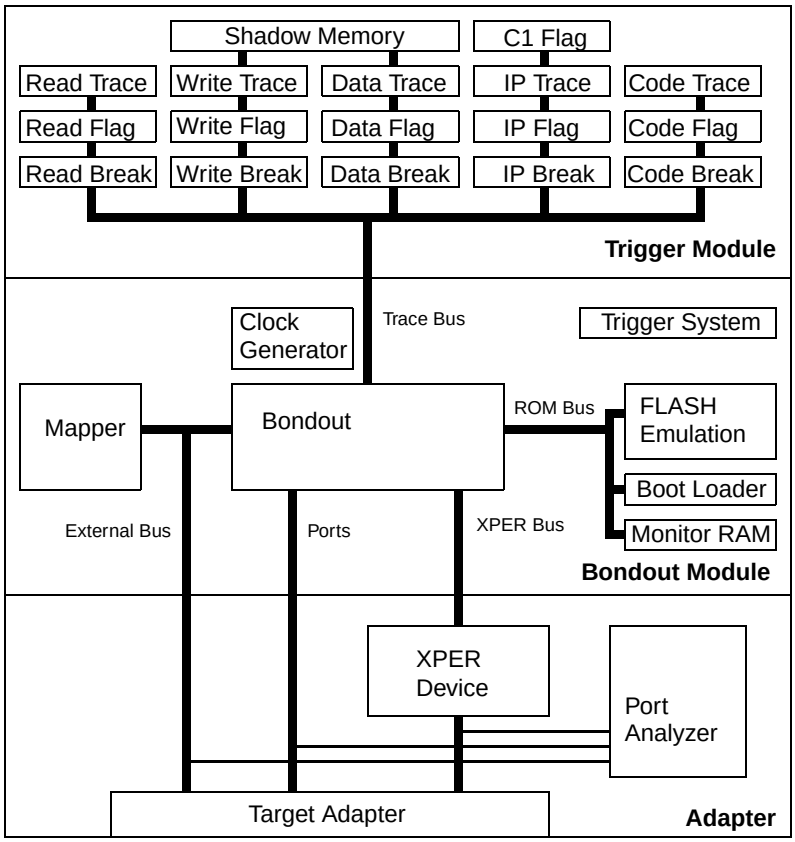
05.12.10

LAUTERBACH DEVELOPMENT TOOLS

The FIRE-166 emulator module supports the whole C166 family. All features of the BONDOUT chips are supported, trigger and selective trace is possible on internal addresses and data, on registers and on peripheral accesses. 128 extra trace channels are used to trace all BONDOUT signals. The ROM and FLASH memory is emulated by an extra emulation system with separate breakpoints and execution flags for code coverage. The emulator can simulate bootstrap sequences and FLASH operation.

Features

Basics of Operation



The TRACE32-FIRE166 supports all features provided by the bondout chip.The bondout chip has 4 bus systems:

- External bus
- ROM emulation bus
- XPER bus
- Bondout trace bus

The ***ROM emulation bus*** emulates together with the 512K emulation RAM on the base module the on-chip ROM or FLASH memory.

The ***XPER bus*** is needed for the emulation of CAN, ASC1 or IIC derivatives. Since the bondout chip does not contain any peripherals, there is a socket on the emulation module to add the specific CAN derivative. For the operation, the core of the derivative is disabled and the bondout CPU uses the XPER bus to emulate the peripherals.

The ***Bondout trace bus*** provides all signals for tracing on internal operations. Since most of the transfers are made between the internal RAM, reg-

isters and internal peripherals, these busses are a big help for analyzing the application´s behaviour.

Operating Modes

The Emulator can work in stand-alone mode with internal clock or in active mode with internal or the target clock. On power-down of the target system the emulator tristates its output buffers and isolates its internal emulation circuits.

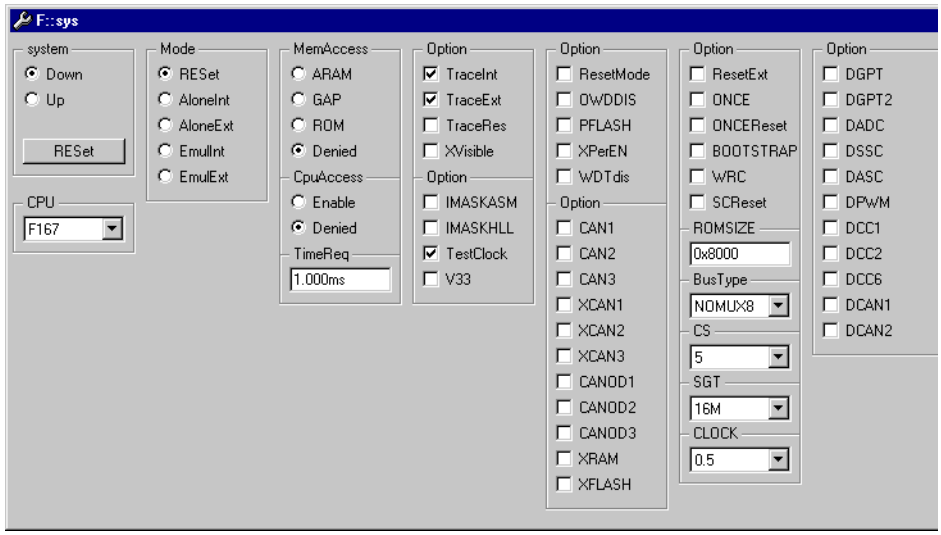
The operation modes are as follows:

- ❏ Reset
- ❏ Alone Internal
- ❏ Alone External
- ❏ Emulation Internal
- ❏ Emulation External

Clock

- ❏ Operation with external or internal Clock
- ❏ 1..150 MHz internal clock

Dual-Port Access



All TRACE32 memories are dual-ported. The dual-port access makes it possible to display and modify the contents of the overlay memory, to set or delete breakpoints or use the flag memory while the application is running in real-time.

The dual-port access on the ROM bus (on-chip ROM and FLASH emulation) is always possible. Their are no limitations on breakpoint and flag usage.

The external bus has 3 modes for dual-port access

- ❏ ARAM
- ❏ GAP
- ❏ ROM

The ***GAP modes*** need extra time, as the dual-port cycle is inserted while the CPU bus is set to idle. This means that

less than 1% of the performance is lost by dualport cycle. In ***ARAM*** mode dualport cycles are done in interleave mode to the ARAM dualported RAM module.

Dualport in ***ROM*** is possible at any time without extra wait states.

ROM Emulation

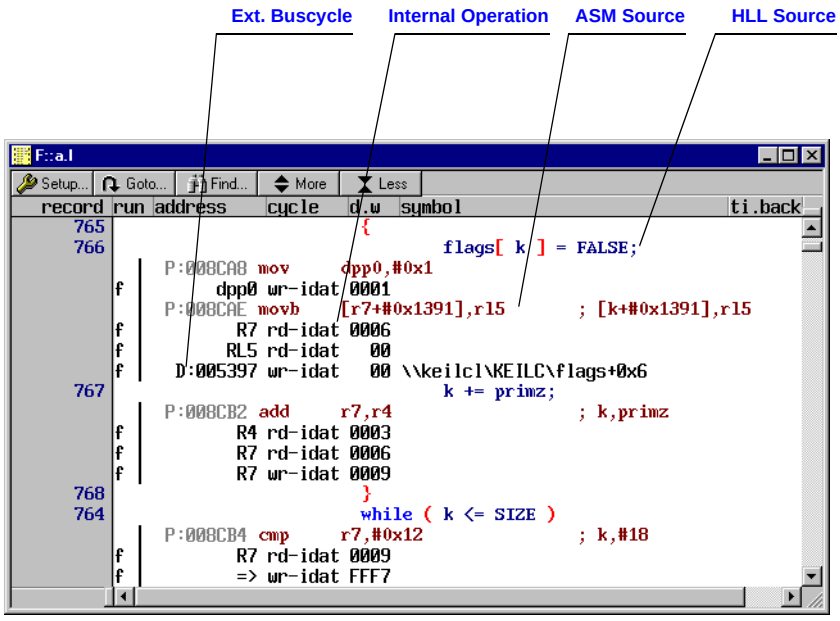
The ROM emulation circuits build a separate emulator system to emulate all on-chip FLASH or ROM based applications.

- 512K ROM emulation memory
  - FLASH and ROM emulation
- 64K Bootloader RAM
  - Bootstrap loader support

Bondout Trace

128 additional trace channels are supported by TRACE32-FIRE166 to trace all signals delivered by the bondout busses.The trace can display internal operations like register to internal memory, peripheral to registers, etc. Stack operations cannot be displayed because there is no information on the bus.

The bondout trigger and trace system uses a complex de-pipeline mechanism to make trace and trigger settings easy for the user. Operand or instruction addresses can be combined very easy for triggering on local variables.



Trace Channels

The bondout trace samples the 128 channels for BONDOUT busses. These channels provide the following information:

- ❏ Instruction execution address
- ❏ Operand read address
- ❏ Operand write address
- ❏ Operand data
- ❏ Control lines
- ❏ Instruction code

Trace Operation

The trace can work on the external bus, the internal bus or on both busses (mixed trace) to sample:

- ❏ Internal CPU cycles (BONDOUT only)
- ❏ External bus cycles
- ❏ Mixed trace

Bondout Trigger System

The bondout trigger system works on the code flow and the other bondout signals to qualify states for internal trigger accesses. Trigger points can be set on operation results or on 24 bit addresses. Future software will support also triggering on register access. All trigger points can be qualified by program segments like functions, program lines, etc.

The following trigger points are available:

- 4 1 Mbyte areas for operand read breakpoints with data qualifiers (Results of operation)
- 4 1 Mbyte areas for operand write breakpoints with data qualifiers (Results of operation)
- 2 separate data breakpoints (value, range or pattern)
- 8 1 MByte areas for instructions breakpoints (hardware breaks)

Every breakpoint can be used to stop emulation or as a input event for the trigger sequencer of the analyzer.

Data Coverage

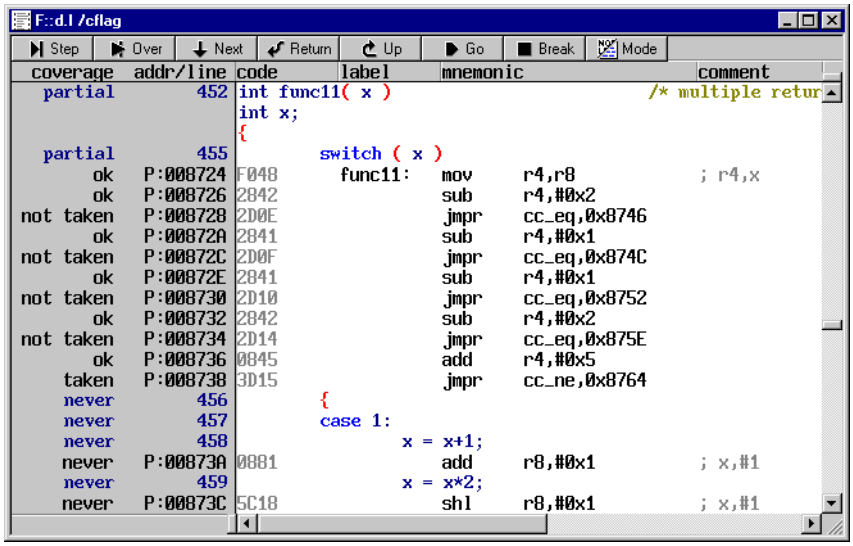
For the read and write operations 2 flags systems are available. All systems have single byte resolution.

- 2 Read Flag Areas with 1 (4) MByte each.
- 2 Write Flag Areas with 1 (4) MByte each.

Code Coverage

The code coverage system allows 100% true code coverage and 100% C1 analysis. Prefetches are ignored.

- 2 Ranges with 1 (4) Mbyte each
- C1 Analysis



Shadow Memory

Schadow memory can be mapped for the external bus and for the XBUS. Emulation of extra XRAM areas is possible. An 1 MByte shadow memory on the bondout busses shows memory states on external busses, **XRAM** and **IRAM**.

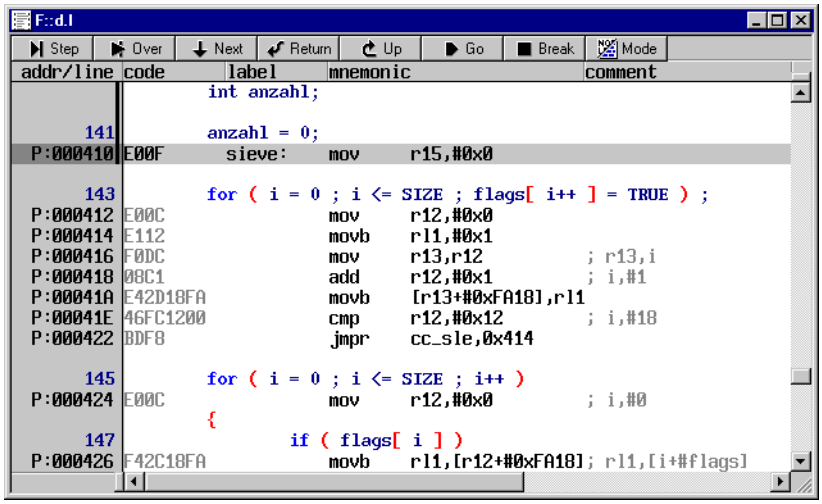
- ❏ 1 MByte Shadow memory

Execution Breakpoints

The emulator supports execution breakpoints on the ROM and external area. All breakpoints are 'break-before-make' breakpoints. Emulation is stopped before execution.

- ❏ Unlimited number of software breakpoints
- ❏ Software breakpoints can be set 'on the fly' by dualport memory access

HLL Debugging

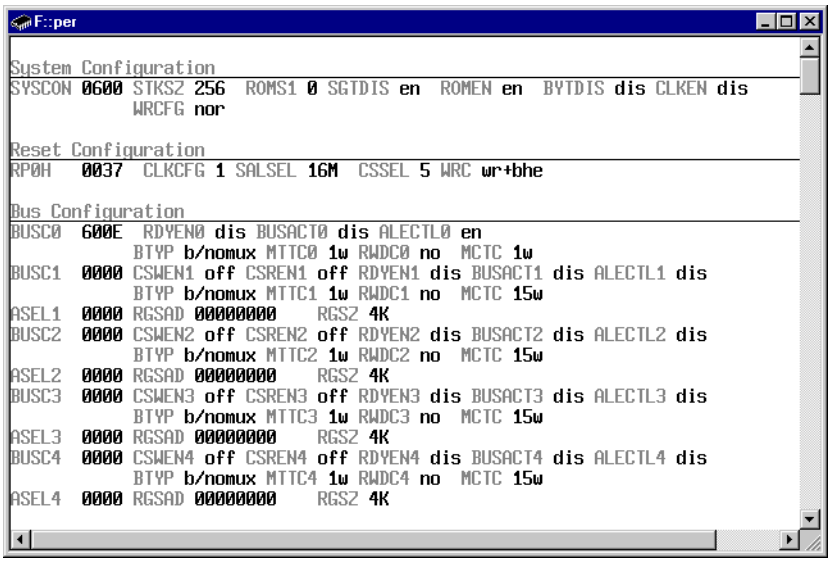


Full support in real-time for:

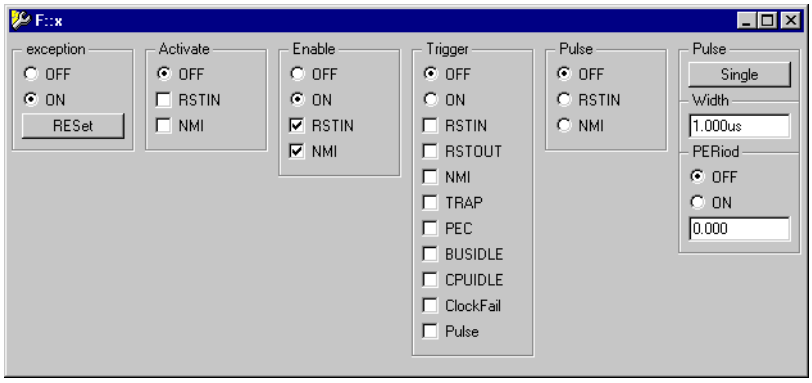
- ROM and external busses
- Break-before-line operation
- HLL single step in real-time
- Trigger and trace on local variables
- Trigger on bit variables

Voltage and Clock Monitors

- ❏ On-Line Display for SYSCON and BUSCON
- ❏ 3.3 V and 5 V Standalone operation



Exception Control



The TRACE32 exception controller allows to permanently activate an exception, to enable or disable specific exceptions, to trigger on specific exceptions or to stimulate an exception.

- ❏ Static exception setting
  - RSTIN
- ❏ Target exception control
  - RSTIN
  - NMI

- Exception trigger
  - RSTOUT
  - RSTIN
  - PWRDOWN
  - IDLE
  - TRAP
  - PEC

Port Analyzer

On the emulation base there is an extra slot for the TRACE32 Port Analyzer. The following additional signals can be traced:

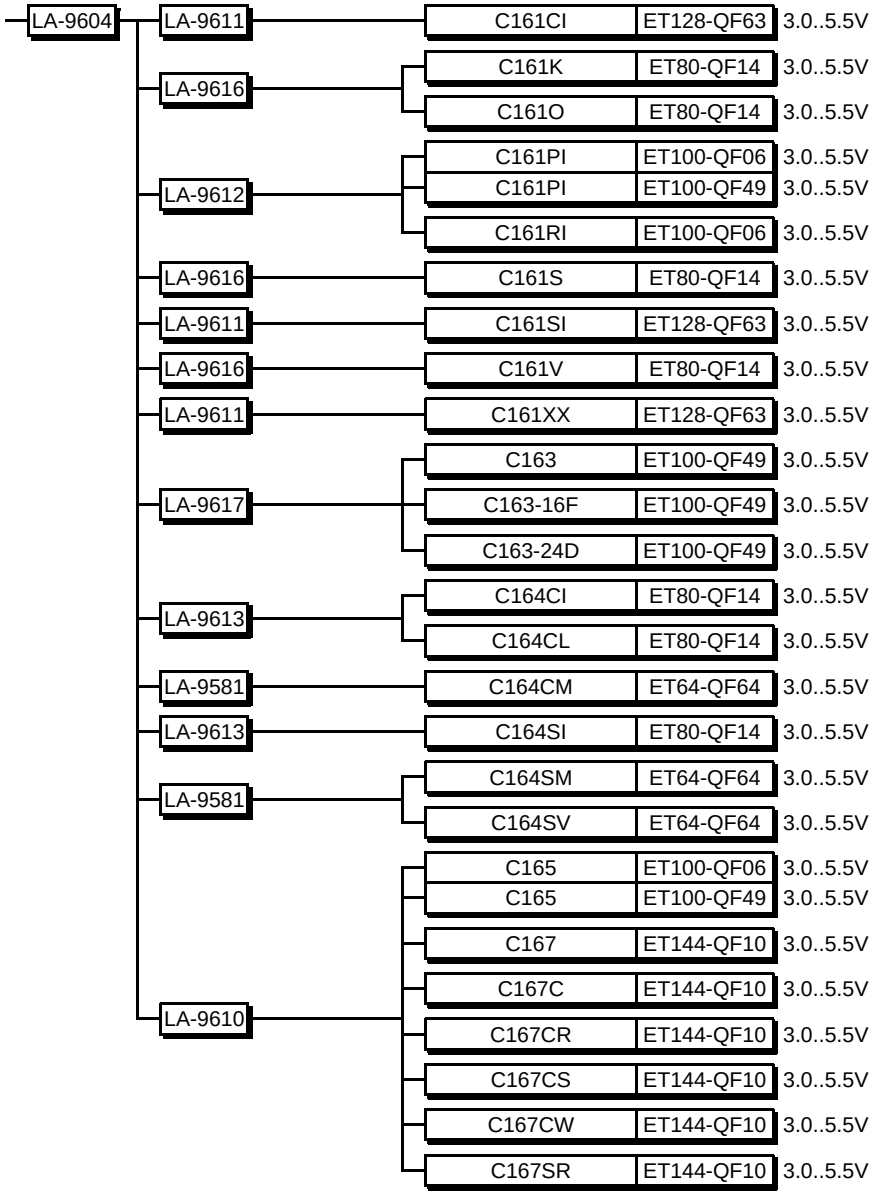
- Port 0
- Port 1
- Port 2
- Port 3
- Port 4
- Port 6
- Port 7
- Port 8
- Port 9
- READY

On-Circuit Emulation

- Support for Clip-Over adapters

Emulation Modules

Modules Overview



PowerView IDE

TRACE32-PowerView supports most compilers, realtime operation systems and debuggers.

New integrations are mostly done on customers request. If your compiler or RTOS is not supported now, please ask us !

Compiler Support

Language	Compiler	Company	Option	Comment
C	C166	ARM Germany GmbH	EOMF-166	
C	XC16X/ST10	Cosmic Software	ELF/ DWARF	
C	GNU-GCC166	HighTec EDV-Systeme GmbH	DBX	
C	C166	TASKING	IEEE	
C++	GNU-CPP166	HighTec EDV-Systeme GmbH	DBX	
C++	CP166	TASKING	IEEE	

RTOS Support

Name	Company	Comment
ARTX-166	ARM Germany GmbH	
CMX-RTX	CMX Systems Inc.	
Nucleus PLUS	Mentor Graphics Corporation	
osCAN	Vector Informatik	via ORTI
OSE Basic	Enea OSE Systems	(OS166)
OSE Epsilon	Enea OSE Systems	(OS166), 3.x
OSEK	-	via ORTI
ProOSEK	Elektrobit Automotive GmbH	via ORTI

Name	Company	Comment
PXROS	HighTec EDV-Systeme GmbH	
RTX166/-tiny	ARM Germany GmbH	
RTXC 3.2	Quadros Systems Inc.	
RTXC Quadros	Quadros Systems Inc.	
Rubus OS	Articus Systems AB	
SDT-Cmicro	IBM Corp.	
uC/OS-II	Micrium Inc.	2.0 to 2.8

Debugger Support

CPU	Debugger	Company	Host
ALL	X-TOOLS / X32	blue river software GmbH	Windows
ALL	CODEWRIGHT	Borland Software Corporation	Windows
ALL	EASYCODE	EASYCODE GmbH	Windows
ALL	ECLIPSE	Eclipse Foundation, Inc	Windows
ALL	RHAPSODY IN MICROC	IBM Corp.	Windows
ALL	RHAPSODY IN C++	IBM Corp.	Windows
ALL	LDRA TOOL SUITE	LDRA Technology, Inc.	Windows
ALL	ATTOL TOOLS	MicroMax Inc.	Windows
ALL	VISUAL BASIC INTERFACE	Microsoft Corporation	Windows
ALL	LABVIEW	NATIONAL INSTRUMENTS Corporation	Windows

CPU	Debugger	Company	Host
ALL	CODE::BLOCKS	Open Source	-
ALL	RAPITIME	Rapita Systems Ltd.	Windows
ALL	DA-C	RistanCASE	Windows
ALL	WINDOWS CE PLATF. BUILDER	Windows	Windows
C166	SDT CMICRO	IBM Corp.	Windows

Operation Voltage and Frequency

The maximum operation frequency of TRACE32-FIRE depends on:

- The max. frequency of the CPU
- The access time of the overlay memory (10ns)
- The mapper mode (**S**low or **F**ast)
- The number of waitstates
  (WO = 0 waitstates
  W1 = 1 waitstate)
- The dual-port access mode
- If no emulation memory is used, the frquency limit depends on the trace speed (TRACE)
- Some probes use extra high-speed memory on the emulation adapter (HEAD RAM)

Max. Frequency with ROM and ARAM Dualport Access

Module	CPU	F-W0-10	F-W1-10	S-W0-10	S-W1-10	CHIP	TRACE	HEAD RAM
LA-9611	C161CI	20.0+	20.0+	20.0+	20.0+	20.0		
LA-9616	C161K	16.0+	16.0+	16.0+	16.0+	16.0		
LA-9616	C161O	16.0+	16.0+	16.0+	16.0+	16.0		
LA-9612	C161PI	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9612	C161RI	16.0+	16.0+	16.0+	16.0+	16.0		
LA-9616	C161S	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9611	C161SI	20.0+	20.0+	20.0+	20.0+	20.0		
LA-9616	C161V	16.0+	16.0+	16.0+	16.0+	16.0		
LA-9611	C161XX	20.0+	20.0+	20.0+	20.0+	20.0		
LA-9617	C163	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9617	C163-16F	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9617	C163-24D	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9613	C164CI	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9613	C164CL	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9581	C164CM	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9613	C164SI	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9581	C164SM	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9581	C164SV	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9610	C165	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9610	C167	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9610	C167C	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9610	C167CR	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9610	C167CS	40.0	40.0+	31.6	40.0+	40.0		
LA-9610	C167CW	25.0+	25.0+	25.0+	25.0+	25.0		
LA-9610	C167SR	25.0+	25.0+	25.0+	25.0+	25.0		

Operation Voltage

This list contains information on probes available for other voltage ranges. Probes not noted here supply an operation voltage range from 4.5V to 5.5V.

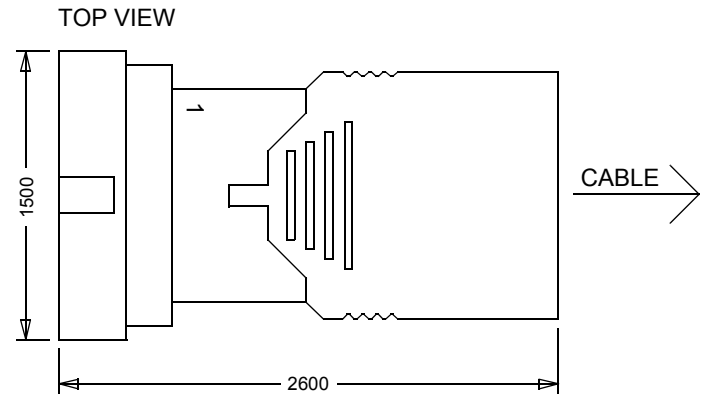
CPU	Module	Adapter	Voltage Range
C161CI	LA-9611	-	3.0 .. 5.5 V
C161K	LA-9616	-	3.0 .. 5.5 V
C161O	LA-9616	-	3.0 .. 5.5 V
C161PI	LA-9612	-	3.0 .. 5.5 V
C161RI	LA-9612	-	3.0 .. 5.5 V
C161S	LA-9616	-	3.0 .. 5.5 V
C161SI	LA-9611	-	3.0 .. 5.5 V
C161V	LA-9616	-	3.0 .. 5.5 V
C161XX	LA-9611	-	3.0 .. 5.5 V
C163	LA-9617	-	3.0 .. 5.5 V
C163-16F	LA-9617	-	3.0 .. 5.5 V
C163-24D	LA-9617	-	3.0 .. 5.5 V
C164CI	LA-9613	-	3.0 .. 5.5 V
C164CL	LA-9613	-	3.0 .. 5.5 V
C164CM	LA-9581	-	3.0 .. 5.5 V
C164SI	LA-9613	-	3.0 .. 5.5 V
C164SM	LA-9581	-	3.0 .. 5.5 V
C164SV	LA-9581	-	3.0 .. 5.5 V
C165	LA-9610	-	3.0 .. 5.5 V
C167	LA-9610	-	3.0 .. 5.5 V
C167C	LA-9610	-	3.0 .. 5.5 V
C167CR	LA-9610	-	3.0 .. 5.5 V
C167CS	LA-9610	-	3.0 .. 5.5 V
C167CW	LA-9610	-	3.0 .. 5.5 V
C167SR	LA-9610	-	3.0 .. 5.5 V

Dimensions

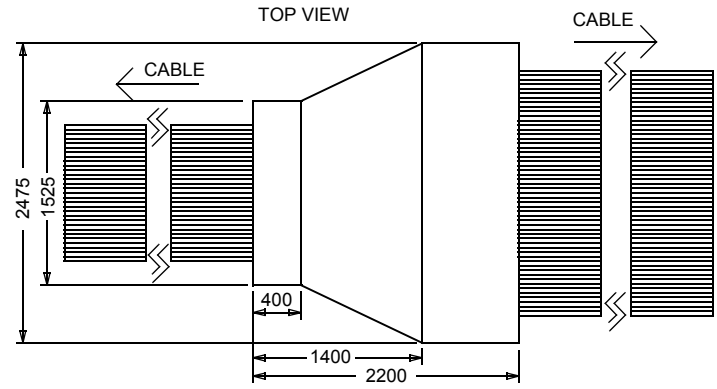
Modules

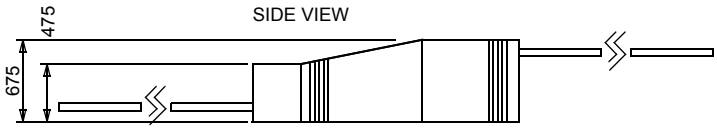
Dimension

LA-7873 PP-COLDFIRE



whisker for target connection





ALL DIMENSIONS IN 1/1000 INCH

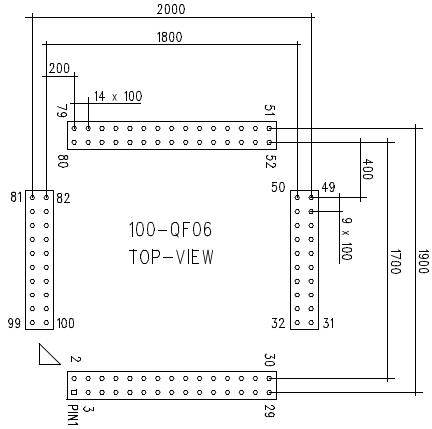
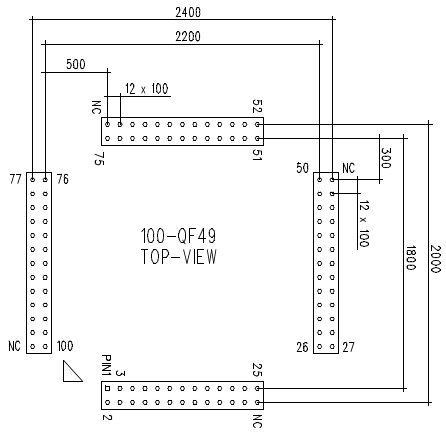
new case, delivery from March 2004

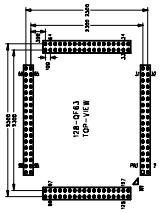
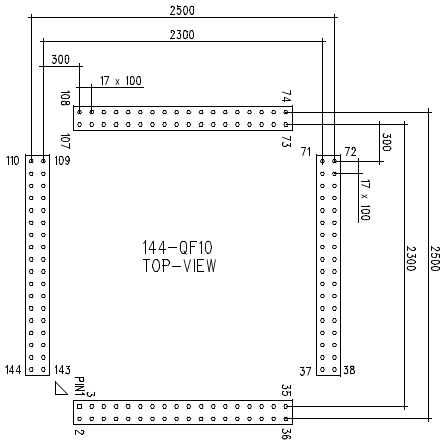
Connectors

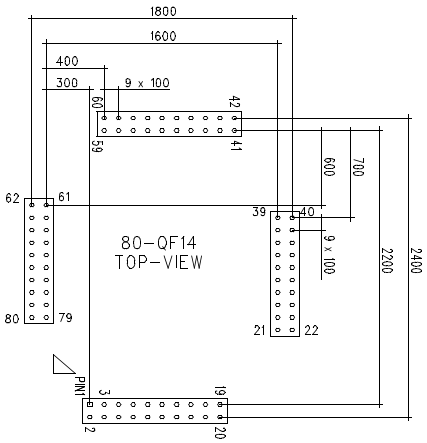
On each emulation module there are half-size connectors to:

- ❏ Connect the emulation module directly to the target by providing the corresponding connectors also on the target hardware
- ❏ Connect a standard adapter from Emulation Technology, YAMAICHI, AMP, TOKYO ELETECH etc.

The following table lists the physical dimensions of these connectors.

CPU	Dimension
C161PI C161RI C165	**ET100-QF06** 
C161PI C163 C163-16F C163-24D C165	**ET100-QF49** 

CPU	Dimension
C161CI C161SI C161XX	**ET128-QF63** 
C167 C167C C167CR C167CS C167CW C167SR	**ET144-QF10** 

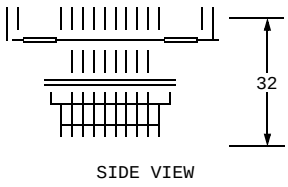
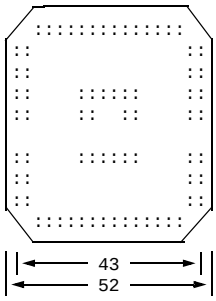
CPU	Dimension
C161K C161O C161S C161V C164CI C164CL C164SI	**ET80-QF14** 

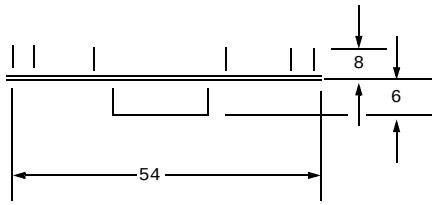
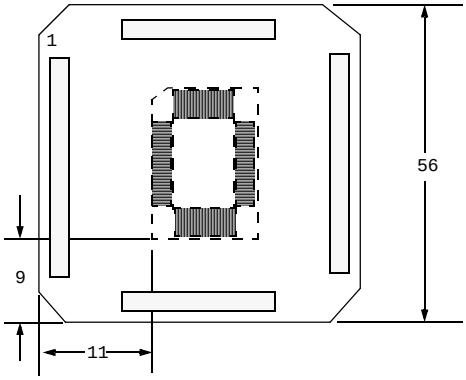
Adapter

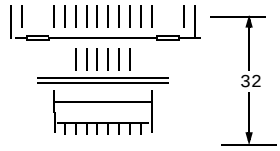
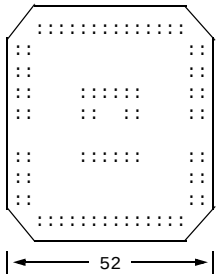
The adapters connect in different ways

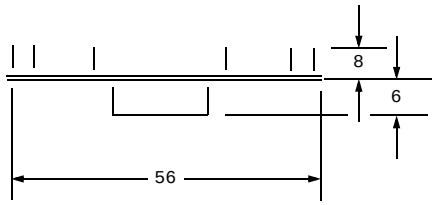
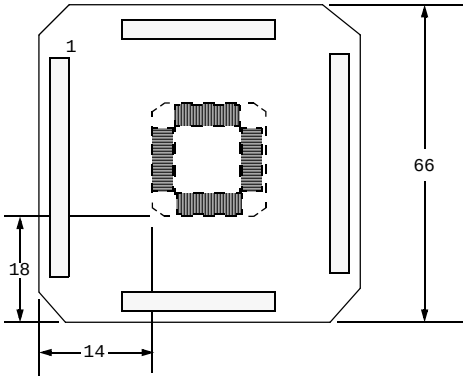
- ❏ With Clip-Over Adapters the CPU can stay on the target board.
- ❏ With Solder-ON adapters the CPU must be removed
- ❏ YAMAICHI and AMP adapters fit to the CPU socket

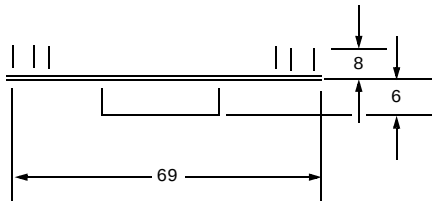
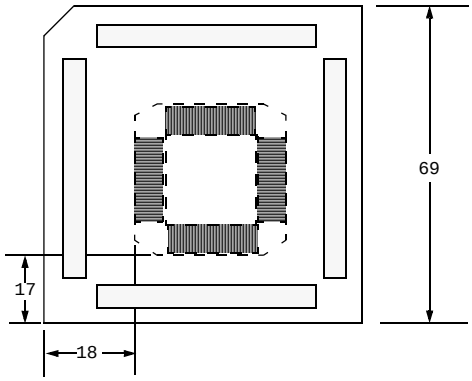
The following table lists the physical dimensions of these adapters.

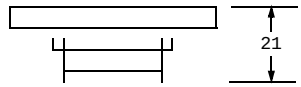
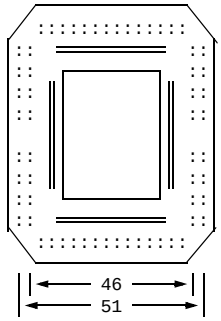
Socket CPU	Adapter
ET100-QF06 C161PI C161RI C165	**ET-1030 ET100-SET-QF06** **Surface Mountable Adapter for ET100 to QF06**  SIDE VIEW  TOP VIEW (all dimensions in mm)

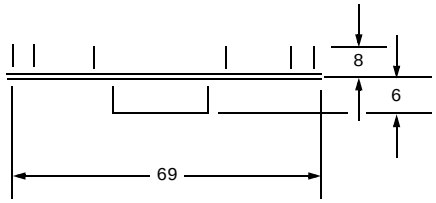
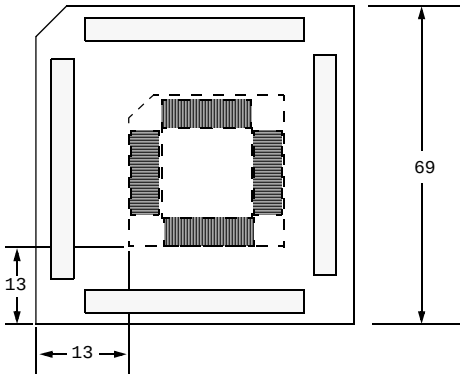
Socket CPU	Adapter
ET100-QF06 C161PI C161RI C165	**YA-1031 ET100-EYA-QF06** **Emul. Adapter for YAMAICHI socket ET100-QF06**  SIDE VIEW  TOP VIEW (all dimensions in mm)

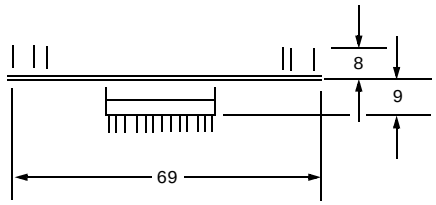
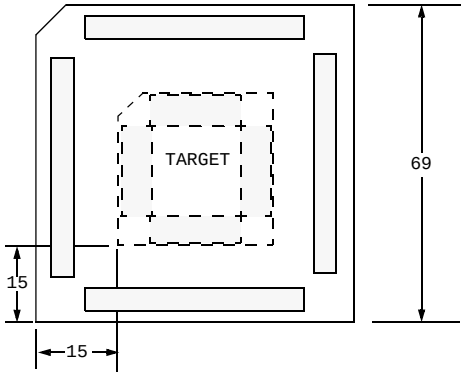
Socket CPU	Adapter
ET100-QF06 C161PI C161RI C165	**ET-1032 ET100-CET-QF06** **Clip-Over Adapter for ET100-QF06**  SIDE VIEW  TOP VIEW (all dimensions in mm)

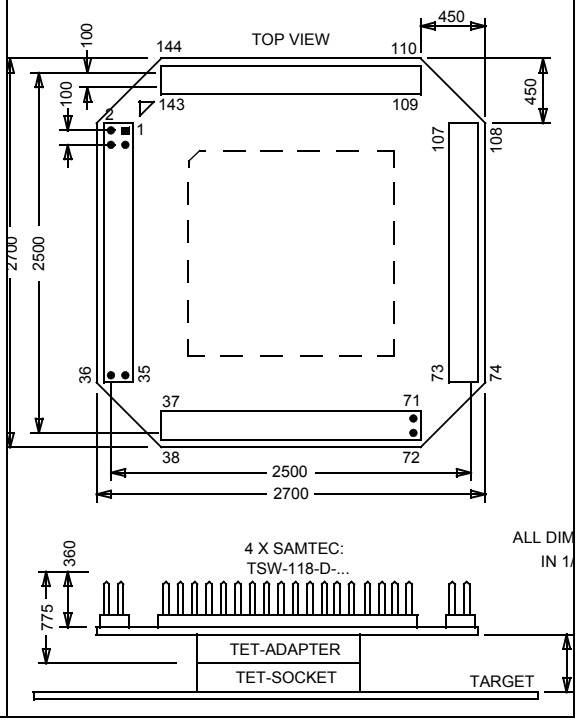
Socket CPU	Adapter
ET100-QF49 C161PI C163 C163-16F C163-24D C165	**YA-1091 ET100-EYA-QF49** **Emul. Adapter for YAMAICHI socket ET100-QF49**  SIDE VIEW  TOP VIEW (all dimensions in mm)

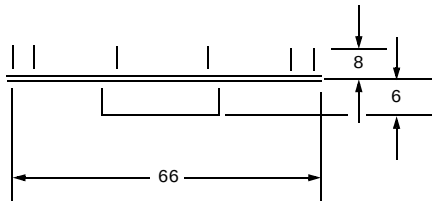
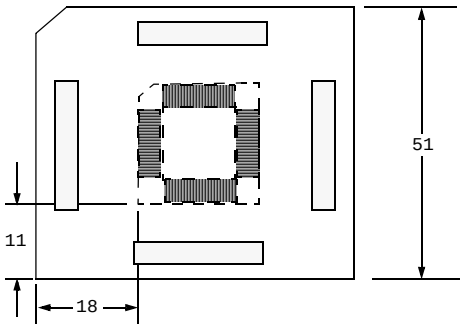
Socket CPU	Adapter
ET128-QF63 C161CI C161SI C161XX	**YA-1112 ET128-EYA-QF63** **Emul. Adapter for YAMAICHI socket ET128-QF63**  SIDE VIEW  TOP VIEW (all dimensions in mm)

Socket CPU	Adapter
ET144-QF10 C167 C167C C167CR C167CS C167CW C167SR	**ET-1090 ET144-SET-QF10** **Surface Mountable Adapter for ET144-QF10**  SIDE VIEW  TOP VIEW (all dimensions in mm)

Socket CPU	Adapter
ET144-QF10 C167 C167C C167CR C167CS C167CW C167SR	**YA-1094 ET144-EYA-QF10** **Emul. Adapter for YAMAICHI socket ET144-QF10**  SIDE VIEW  TOP VIEW (all dimensions in mm)

Socket CPU	Adapter
ET144-QF10 C167 C167C C167CR C167CS C167CW C167SR	**LA-1096 ET144-FP144** **Adapter ET144 to Footprint AMP Sockets**  SIDE VIEW  TOP VIEW (all dimensions in mm)

Socket CPU	Adapter
ET144-QF10 C167 C167C C167CR C167CS C167CW C167SR	**TO-1300 ET144-ETO-QF10** **Emul. Adapter for T0 socket ET144-QF10** 

Socket CPU	Adapter
ET80-QF14 C161K C161O C161S C161V C164CI C164CL C164SI	**YA-1131 ET80-EYA-QF14** **Emul. Adapter for YAMAICHI socket ET080-QF14**  SIDE VIEW  TOP VIEW (all dimensions in mm)

Available Tool Chain

TRACE32 provides a complete set of development tools for this family. This includes:

- The In-Circuit Emulator TRACE32-ICE
- The high speed RISC Emulator TRACE32-FIRE
- The BDM/JTAG/ONCE etc. based In-Circuit Debugger TRACE32-ICD
- The ROM Monitor based In-Circuit Debugger TRACE32-ICD
- The ICD Trace, a trace externsion to the BDM/JTAG debuggers or ROM monitors
- Evaluation boards, which can be used until the target hardware is available.
- The Instruction Set Simulator (SIM), a software tool for code test without any hardware

The following list give an overview which development tools are available for the specific derivatives of this family.

CPU	ICE	FIRE	ICD DEBUG	ICD MONITOR	ICD TRACE	POWER INTEGRATOR	INSTRUCTION SIMULATOR
C161CI	YES	YES		YES			YES
C161K	YES	YES		YES	YES		YES
C161O	YES	YES		YES	YES		YES
C161PI	YES	YES		YES			YES
C161RI	YES	YES		YES			YES
C161S	YES	YES		YES	YES		YES
C161SI	YES	YES		YES			YES
C161V	YES	YES		YES	YES		YES
C161XX	YES	YES		YES			YES
C163	YES	YES		YES			YES
C163-16F	YES	YES		YES			YES
C163-24D	YES	YES		YES			YES
C164CI	YES	YES		YES			YES
C164CL	YES	YES		YES			YES
C164CM		YES		YES			YES
C164SI		YES		YES			YES
C164SM		YES		YES			YES
C164SV		YES		YES			YES
C165	YES	YES		YES	YES		YES
C167	YES	YES		YES	YES		YES
C167C	YES	YES		YES	YES		YES
C167CR	YES	YES		YES	YES		YES
C167CS	YES	YES		YES	YES		YES
C167CW	YES	YES		YES	YES		YES
C167SR	YES	YES		YES	YES		YES

Order Information

Module Description

OrderNo Code	Text
LA-9604 FIRE-166	**FIRE Emulator for C166 Family** Bondout Module for C166 Family, 512K Flash Emulation, 33 MHz operation with E3 bondout requires FIRE-ARAM requires Trigger Module for ST10/C161..C167 (LA-9602)
LA-9602 FIRE-166- TRIGG-64K	**Trigger Module for ST10 / C161..C167** 128 Trace Channels, Bondout Trigger System, Bondout Flag System, Shadow RAM, 64K Trace
LA-9630 FIRE-166- TRIGG-512K	**Trigger Module for ST10/C16x 512K Trace** 128 Trace Channels, Bondout Trigger System, Bondout Flag System, Shadow RAM, 512K Trace
LA-9610 M-ST10/C167	**Module for ST10/C167** Module for TQFP100 and PQFP144 supports ST10x163, ST10R165, ST10x167, ST10x168, ST10xx69, C163, C165, C167xx, ST10R172L, ST10R262, ST10272L Connectors for ET100-QF06 and ET-144
LA-9611 M-C161CS	**Module for C161CI/SI/JI/CS** Module for TQFP128, supports C161CI, SI, JI, CS, JC
LA-9612 M-C161PI	**Module for C161RI/PI** Module for ET100-QF49, supports C161PI, RI
LA-6618 CPU_C161	**CPU Adapter C161SI/CI/CS** CPU adapter for LA-6613, without CPU
LA-9613 M-C164CI	**Module for C164CI** Module for ET80-QF14, supports C164CI, C164CL
LA-9614 M-C164CR	**Module for C164CR** Module for ET80-QF14, supports C164CR
LA-9616 M-C161V	**Module for C161S/V/K/O** Module for ET80-QF14, ET80-QF18, supports C161S, C161V, C161K and C161O
LA-9617 M-C163	**Module for C163** Module for ET100-QF49, supports C163, 3.3 and 5 V
LA-9581 M-C164CM	**Module for C164CM** Module for ET64-QF64, supports C164CM, C164SM, C164SV

Detailed Order Information

Order No.	Code	Text
LA-9604	**FIRE-166**	**FIRE Emulator for C166 Family**
LA-9602	**FIRE-166-TRIGG-64K**	**Trigger Module for ST10 / C161..C167**
LA-9630	**FIRE-166-TRIGG-512K**	**Trigger Module for ST10/C16x 512K Trace**
LA-9610	**M-ST10/C167**	**Module for ST10/C167**
LA-9611	**M-C161CS**	**Module for C161CI/SI/JI/CS**
LA-9612	**M-C161PI**	**Module for C161RI/PI**
LA-6618	**CPU_C161**	**CPU Adapter C161SI/CI/CS**
LA-9613	**M-C164CI**	**Module for C164CI**
LA-9614	**M-C164CR**	**Module for C164CR**
LA-9616	**M-C161V**	**Module for C161S/V/K/O**
LA-9617	**M-C163**	**Module for C163**
LA-9581	**M-C164CM**	**Module for C164CM**
Additional Options		
ET-1032	ET100-CET-QF06	Clip-Over Adapter for ET100-QF06
TO-1260	ET100-ETO-QF06	Emul. Adapter for TO socket ET100-QF06
TO-1250	ET100-ETO-QF49	Emul. Adapter for T0 socket ET100-QF49
TO-1255	ET100-ETO-SE	Emul. Adapter for T0 socket ET100-SE 0.4mm
YA-1031	ET100-EYA-QF06	Emul. Adapter for YAMAICHI socket ET100-QF06
YA-1091	ET100-EYA-QF49	Emul. Adapter for YAMAICHI socket ET100-QF49
ET-1030	ET100-SET-QF06	Surface Mountable Adapter for ET100 to QF06
ET-1092	ET100-SET-QF49	Surface Mountable Adapter for ET100-QF49
TO-1261	ET100-STO-QF06	Emul. Adapter TO-surface mount. ET100-QF06
TO-1251	ET100-STO-QF49	Emul. Adapter TO-surface mount. ET100-QF49
YA-1112	ET128-EYA-QF63	Emul. Adapter for YAMAICHI socket ET128-QF63
ET-1095	ET144-CET-QF10	Clip Over Adapter for ET144-QF10
ET-1109	ET144-CET-QF63	Clip Over Adapter for ET144-QF63
TO-1300	ET144-ETO-QF10	Emul. Adapter for T0 socket ET144-QF10
TO-1310	ET144-ETO-QF63	Emul. Adapter for T0 socket ET144-QF63
YA-1094	ET144-EYA-QF10	Emul. Adapter for YAMAICHI socket ET144-QF10
YA-1111	ET144-EYA-QF63	Emul. Adapter for YAMAICHI socket ET144-QF63
LA-1096	ET144-FP144	Adapter ET144 to Footprint AMP Sockets
ET-1090	ET144-SET-QF10	Surface Mountable Adapter for ET144-QF10
ET-1110	ET144-SET-QF63	Surface Mountable Adapter for ET144-QF63
TO-1301	ET144-STO-QF10	Emul. Adapter TO-surface mount. ET144-QF10

Order No.	Code	Text
TO-1311	ET144-STO-QF63	Emul. Adapter TO-surface mount. ET144-QF63
TO-1245	ET64-ETO-QF64	Emul. Adapter for T0 socket ET64-QF64
ET-1132	ET80-CET-QF14	Clip Over Adapter for QF14
TO-1275	ET80-ETO-QF14	Emul. Adapter for T0 socket ET080-QF14
YA-1131	ET80-EYA-QF14	Emul. Adapter for YAMAICHI socket ET080-QF14
ET-1130	ET80-SET-QF14	Surface Mountable Adapter for ET80-QF14
TO-1276	ET80-STO-QF14	Emul. Adapter TO-surface mount. ET080-QF14
LA-7512	MON-166	ROM Monitor for C166/ST10 on ESI
LA-8803	SIM-166	Instruction Set Simulator for C166/ST10

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