Agilent U2781A USB Modular Instrument Chassis

User's Guide

Agilent Technologies

Notices

Manual Part Number

Edition

Trademark Acknowledgements

Warranty

Technology Licenses

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met. If the equipment is used in a manner not specified by the manufaturer, the protection provided by the equipment may be impaired.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Safety Information

The following general safety precautions must be observed during all phases of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies, Inc. assumes no liability for the customer's failure to comply with these requirements.

Safety Symbols

The following symbols indicate that precautions must be taken to maintain safe operation of the instrument.

⎓	Direct current
⚠	Warning

Regulatory Markings

CE ISM 1-A	The CE mark shows that the product complies with all the relevant European Legal Directives (if accompanied by a year, it signifies when the design was proven).
CSA ® C US	The CSA mark is a registered trademark of the Canadian Standards Association. A CSA mark with the indicators "C" and "US" means that the product is certified for both the U.S. and Canadian markets, to the applicable American and Canadian standards.
N10149	The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australian EMC Framework regulations under the terms of the Radio Communications Act of 1992.
ICES/NMB-001	This ISM device complies with the Canadian ICES-001.

General Safety Information

WARNING

- **Do not use the device if it is damaged. Before you use the device, inspect the case. Look for cracks or missing plastic. Do not operate the device around explosive gas, vapor or dust.**
- **Do not apply more than the rated voltage (as marked on the device) between terminals, or between terminal and external ground.**
- **Always use the device with the cables provided.**
- **Observe all markings on the device before connecting to the device.**
- **Turn off the device and application system power before connecting to the I/O terminals.**
- **When servicing the device, use only specified replacement parts.**
- **Do not operate the device with the removable cover removed or loosened.**
- **Do not connect any cables and terminal block prior to performing self-test process.**

CAUTION

- Do not load the output terminals above the specified current limits. Applying excessive voltage or overloading the device will cause irreversible damage to the circuitry.
- Applying excessive voltage or overloading the input terminal will damage the device permanently.
- If the device is used in a manner not specified by the manufacturer, the protection provided by the device may be impaired.
- Always use dry cloth to clean the device. Do not use ethyl alcohol or any other volatile liquid to clean the device.
- Do not permit any blockage of the ventilation holes of the device.

Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

This instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category:

With reference to the equipment types in the WEEE directive Annex 1, this instrument is classified as a "Monitoring and Control Instrument" product.

The affixed product label is shown as below:
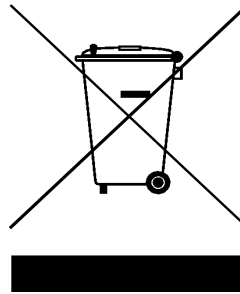
Do not dispose in domestic household waste

To return this unwanted instrument, contact your nearest Agilent office, or visit:

http://www.agilent.com/environment/product

for more information.

In This Guide...

1 **Getting Started** provides an overview of the U2781A USB modular instrument chassis, the product outlook and dimension. This chapter also contains instructions on how to get started with the U2781A USB modular chassis.

2 **Features and Functions** provides information for better understanding of the features and functions of the U2781A USB modular instrument chassis.

3 **Characteristics and Specifications** specifies the characteristics, environment conditions, and specifications of the U2781A USB modular instrument chassis.

Agilent Technologies	**DECLARATION OF CONFORMITY** According to ISO/IEC Guide 22 and CEN/CENELEC EN 45014	C E

Manufacturer's Name: Agilent Technologies Microwave Products (M) Sdn. Bhd
Manufacturer's Address: Bayan Lepas Free Industrial Zone,
11900, Bayan Lepas, Penang, Malaysia

Declares under sole responsibility that the product as originally delivered

Product Name: USB Modular Instrument Chassis (USB Card cage)
Models Number: U2781A
Product Options: This declaration covers all options of the above product(s)

complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

Low Voltage Directive (73/23/EEC, amended by 93/68/EEC)
EMC Directive (89/336/EEC, amended by 93/68/EEC)

and conforms with the following product standards:

EMC

Standard	Limit
IEC 61326-1:1997+A1:1998 / EN 61326-1:1997+A1:1998	
CISPR 11:1990 / EN55011:1991	Class A Group 1
IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995	4 kV CD, 8 kV AD
IEC 61000-4-3:1995 / EN 61000-4-3:1995	3 V/m, 80-1000 MHz
IEC 61000-4-4:1995 / EN 61000-4-4:1995	0.5 kV signal lines, 1 kV power lines
IEC 61000-4-5:1995 / EN 61000-4-5:1995	0.5 kV line-line, 1 kV line-ground
IEC 61000-4-6:1996 / EN 61000-4-6:1996	3 V, 0.15-80 MHz
IEC 61000-4-11:1994 / EN 61000-4-11:1994	1 cycle / 100%

Canada: ICES-001:1998
Australia/New Zealand: AS/NZS 2064.1

The product was tested in a typical configuration with Agilent Technologies test systems.

Safety IEC 61010-1:2001 / EN 61010-1:2001
Canada: CSA C22.2 No. 61010-1:2004
USA: UL 61010-1: 2004

Supplementary Information:
U2781A is USB Modular Instrument chassis with 6 USB modules slot.

This DoC applies to above-listed products placed on the EU market after:

19-Dec-2006
Date

Mack Soh
Quality Manager

For further information, please contact your local Agilent Technologies sales office, agent or distributor, or Agilent Technologies Deutschland GmbH, Herrenberger Straße 130, D 71034 Böblingen, Germany.

Template: A5971-5302-2, Rev. B.01   U2781A   Rev 1.0

Product Regulations

EMC		Performance Criteria
	IEC 61326-1:1997+A1:1998 / EN 61326-1:1997+A1:1998	
	CISPR 11:1990 / EN 55011:1991 – Group 1 Class A	
	IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995 (ESD 4kV CD, 8kV AD)	B
	IEC 61000-4-3:1995 / EN 61000-4-3:1995 (3V/m, 80% AM)	A
	IEC 61000-4-4:1995 / EN 61000-4-4:1995 (EFT 0.5kV line-line, 1kV line-earth)	B
	IEC 61000-4-5:1995 / EN 61000-4-5:1995 (Surge 0.5kV line-line, 1kV line-earth)	B
	IEC 61000-4-6:1996 / EN 61000-4-6:1996 (3V, 0.15~80 MHz, 80% AM, power line)	A
	IEC 61000-4-11:1994 / EN 61000-4-11:1994 (Dips 1 cycle, 100%)	C
	Canada: ICES-001:1998 Australia/New Zealand: AS/NZS 2064.1	
Safety	IEC 61010-1:2001 / EN 61010-1:2001 Canada: CSA C22.2 No. 61010-1:2004 USA: UL 61010-1: 2004	

Additional Information:

The product herewith complies with the essential requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (including 93/68/EEC) and carries the CE Marking accordingly (European Union).

[1]Performance Criteria:

A Pass - Normal operation, no effect.
B Pass - Temporary degradation, self recoverable.
C Pass - Temporary degradation, operator intervention required.
D Fail - Not recoverable, component damage.
N/A – Not applicable

Notes:

Regulatory Information for Canada

ICES/NMB-001:1998
This ISM device complies with Canadian ICES-001.
Cet appareil ISM est confomre à la norme NMB-001 du Canada.

Regulatory Information for Australia/New Zealand

This ISM device complies with Australian/New Zealand AS/NZS 2064.1

Ⓒ N10149

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1
Getting Started

This chapter provides an overview of the U2781A USB modular instrument chassis, the product outlook and dimension. This chapter also contains instructions on how to get started with the chassis from the installation of modules to the chassis to the installations of hardware and software to the start-up and configurations of Agilent Measurement Manager application software.

Agilent Technologies

1

Introduction

The U2781A USB modular instrument chassis is a 4U height chassis with six USB module slots. It is a portable chassis with high performance added value. It targets a wide range of applications in both industrial and scientific environments. It helps to lower cost of test and accelerate your test system integration and development.

The Agilent U2781A is equipped with USB plug-and-play connectivity. The USB interface that is compliant with the TMC-488.2 Standards work seamlessly with Agilent Measurement Manager software and can be controlled remotely via industry standard SCPI commands. In addition, the U2781A modular instrument chassis comes with Agilent IO Libraries Suite 14.2.

The U2781A modular instrument chassis comes with star trigger bus, which offers precise synchronization between USB modules and the external trigger signal. The star trigger bus is a dedicated trigger lines between the external trigger input and USB slots.

The Agilent U2781A USB modular instrument chassis can be applied to nearly any industrial data acquisition, industrial automation and education environment. The primary advantage is its synchronization capability between modules.

Product Overview

Product Outlook

Front View

Module
L-Mount Kit

Bumper

ON/OFF
switch

Rear View

Trigger In

USB Port

Trigger Out

Ext 10 MHz

AC Input

Dimensions

197.00 mm

270.00 mm

271.20 mm
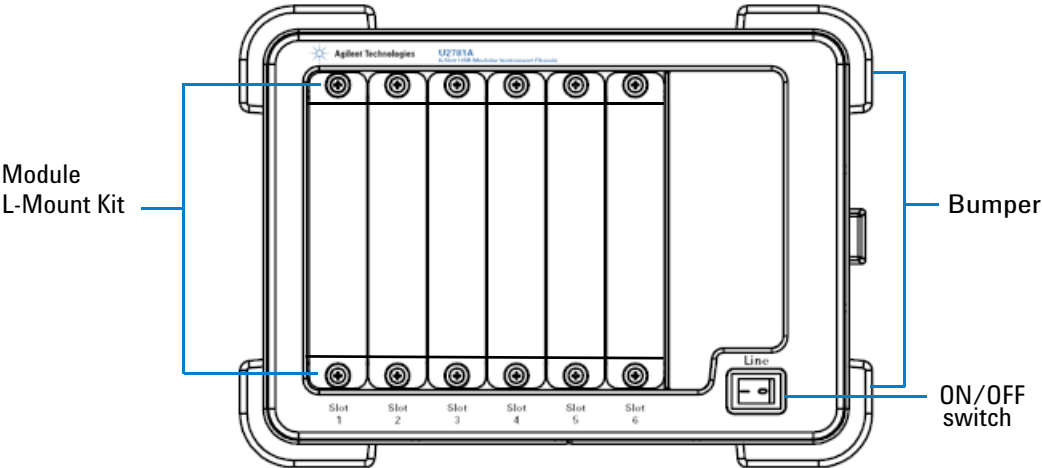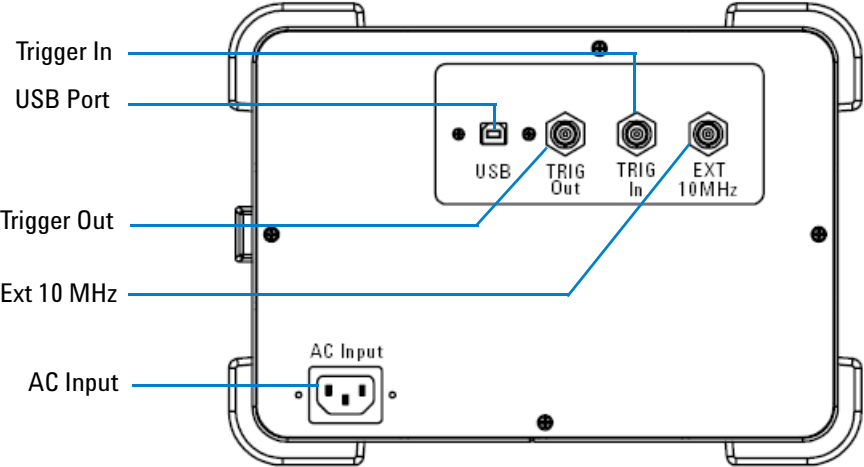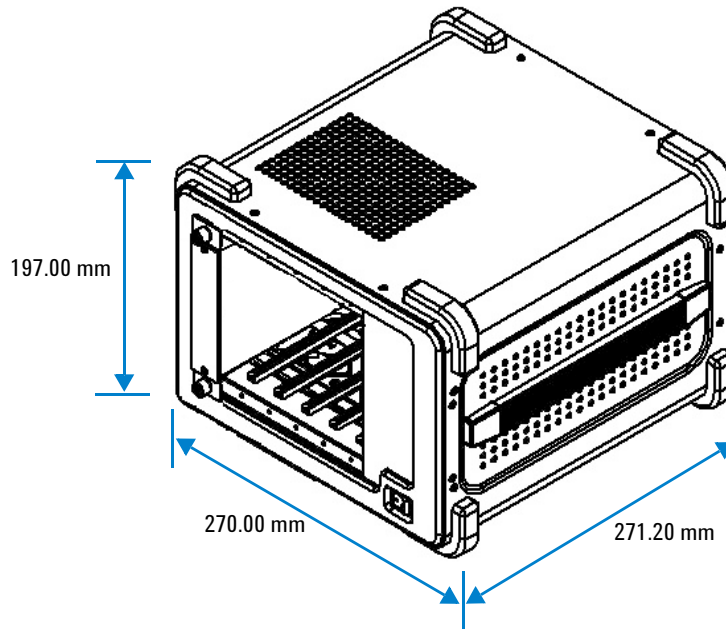
Standard Purchase Items Checklist

Inspect and verify the following items for the standard purchase of U2781A USB modular instrument chassis. If there are missing items, contact the nearest Agilent Sales Office.

✔ Power cord

✔ USB Extension Cable

✔ Agilent USB Modular Products and Systems Quick Start Guide

✔ Agilent USB Modular Products and Systems Product Reference DVD-ROM

✔ Agilent Automation-Ready CD-ROM (contains the Agilent IO Libraries Suite)

✔ Functional Test Certificate

Installations and Configurations

If you are using the U2781A USB modular instrument chassis with the Agilent Measurement Manager, follow the step-by-step instructions as shown in the *Agilent USB Modular Products and Systems Quick Start Guide*.

NOTE	You need to install IVI-COM driver before using the U2781A Series with Agilent VEE, LabVIEW or Microsoft Visual Studio.

General Maintenance

NOTE	Repair or service which are not covered in this manual should only be performed by qualified personnel.

To remove the dirt or moisture in the chassis panel, the cleaning steps are as follows:

1 Power off the chassis device and remove the power cord and I/O cable from the chassis.

2 Shake out any dirt that may have accumulated inside the chassis device.

3 Wipe the chassis with a dry cloth.

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2
Features and Functions

This chapter provides information for better understanding of the features and functions of the U2781A USB modular instrument chassis.

Introduction

The Agilent U2781A USB modular instrument chassis provides six USB modular slots and is equipped with 200 W universal AC power supply and built-in over current protection circuit. A 10 MHz system reference clock is supplied to each modules slots. There are two temperature sensors and a monitoring fan control circuit to monitor the internal temperature and speed of the fan. The fan is mainly used for heat dissipation.

The chassis also provides external 10 MHz reference clock, external trigger in and trigger out functions via BNC connectors at the rear panel.

The key function for the chassis is to provide users with flexibility when using the U2781A modular instrument chassis. The modular chassis allocates housing for six USB modules with built-in power supply. The USB backplane provides a means to synchronize the modules.

The key features of the U2781A USB modular instrument chassis are as follows:

- Simultaneous Synchronization (SSI)
- Star trigger
- Internal and external 10 MHz reference clock
- Trigger in and trigger out signals
- Standard SCPI commands
- IVI-COM driver compatibility
- USBTMC 488.2 compliant
- Hi-Speed USB 2.0 interface

The key functions of the Agilent U2781A USB modular instrument chassis will be elaborated in the following sections.

USB Backplane

55-Pin Backplane Connector Pins Configuration

11	GND	+12V	+12V	GND	USB_D+	USB_D-	GND
10	GND	+12V	+12V	+12V	GND	GND	GND
9	GND	+12V	+12V	+12V	GND	USB_VBUS	GND
8	GND	LBL0	BRSV	GND	TRIG0	LBR0	GND
7	GND	LBL1	GA0	TRIG7	GND	LBR1	GND
6	GND	LBL2	GA1	GND	TRIG1	LBR2	GND
5	GND	LBL3	GA2	TRIG6	GND	LBR3	GND
4	GND	LBL4	STAR TRIG	GND	TRIG2	LBR4	GND
3	GND	LBL5	GND	TRIG5	GND	LBR5	GND
2	GND	LBL6	CLK10M	GND	TRIG3	LBR6	GND
1	GND	LBL7	GND	TRIG4	GND	LBR7	GND
	Z	A	B	C	D	E	F

Table 2-1 Pin information of SSI connector

SSI timing signal	Functionality
+12V	+12 V power from backplane
GND	Ground
BRSV	Reserved pin
TRIG0~TRIG7	Trigger bus 0 ~ 7
STAR_TRIG	Star trigger
CLK10M	10MHz reference clock
USB_VBUS	USB bus power, +5 V
USB_D+, USB_D–	USB differential pair
LBL <0..7> and LBR <0..7>	Reserved pin
GA0, GA1, GA2	Geographical address pin
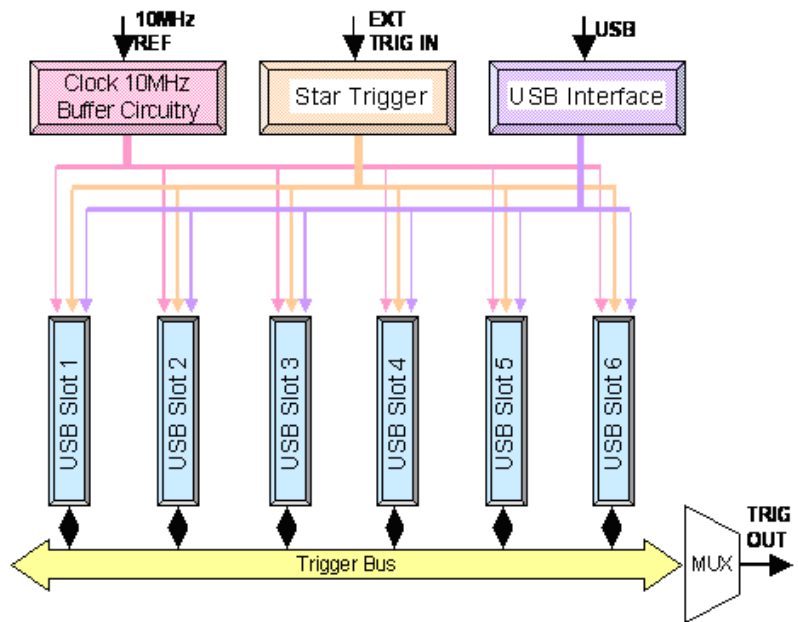
Figure 2-**1**   USB backplane block diagram

Trigger Bus (TRIG [0..7])

Trigger Bus (TRIG [0..7]) is an 8-bit digital bus connected from slot 1 to slot 6 to synchronize different USB modules. This trigger bus enables the USB modules of passing trigger signals to one another.

To have one of the modules to control the operation of the other modules, set the particular module as MASTER and the rest as SLAVE (refer to **Simultaneous Synchronization (SSI)** for more details). The control signal is sent from the MASTER module to the SLAVE modules through this trigger bus. See following figure for the bus architecture.
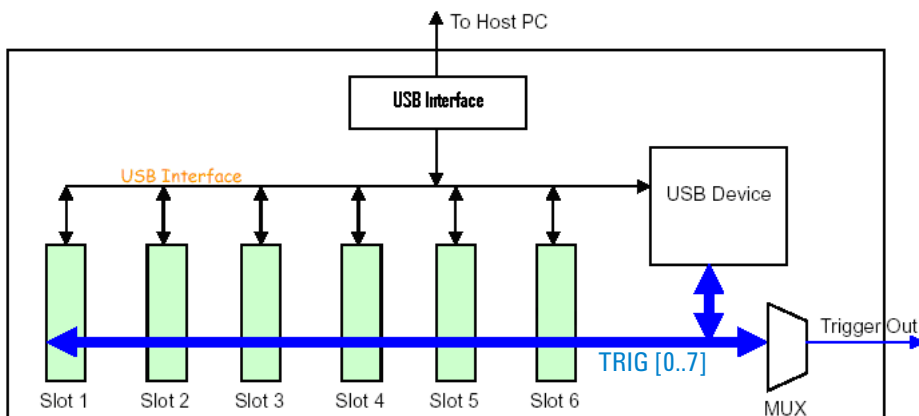
Figure 2-2   Block diagram of Trigger Bus (TRIG [0..7]) and Trigger Out

In addition, the trigger bus can also be used to carry out the pre-configuration of the chassis and modules before any triggering activities. Refer to **Identifying Modules Location** for more information.

External Trigger Out

Trigger Out selects one of the eight lines from trigger bus (TRIG [0..7]) as an external trigger source. The selection of the trigger out line is done by the USB device in the chassis as illustrated in Figure 2-2 by means of a multiplexer. Table 2-2 defines the available trigger out signals provided by U2300A, U2500A, and U2600A Series DAQ, whereas for U2700A Series modular products, user is allowed to choose any trigger line from the trigger bus (TRIG [0..7]) as an external trigger source.

The SCPI command below is used to select one of the lines or bits of the trigger bus (TRIG [0..7]) as an external trigger source:

```
TRIGger:OUT {0|1|2|3|4|5|6|7}
```

Table 2-2 Trigger out bits for U2300A, U2500A, and U2600A Series DAQ devices

Trigger Out	Function
Bit-0	Time base
Bit-1	Reserved
Bit-2	Reserved
Bit-3	A/D trigger
Bit-4	Reserved
Bit-5	Reserved
Bit-6	Reserved
Bit-7	D/A trigger

External Trigger In (Star Trigger)

The star trigger bus offers a very high performance or precise synchronization between modules. The star trigger bus is a dedicated trigger line between the External Trigger Input and USB slots. This trigger signal is sent from external to each slot through a 1-to-6 CLK buffer. The slot-to-slot skews are minimized to ensure that trigger signal reaches all six slots simultaneously. Refer to the following figure for the star trigger bus architecture illustration.

To set star trigger as the module trigger source, the following SCPI command is sent to the modules:

```
OUTP:TRIG:SOUR STRG
```
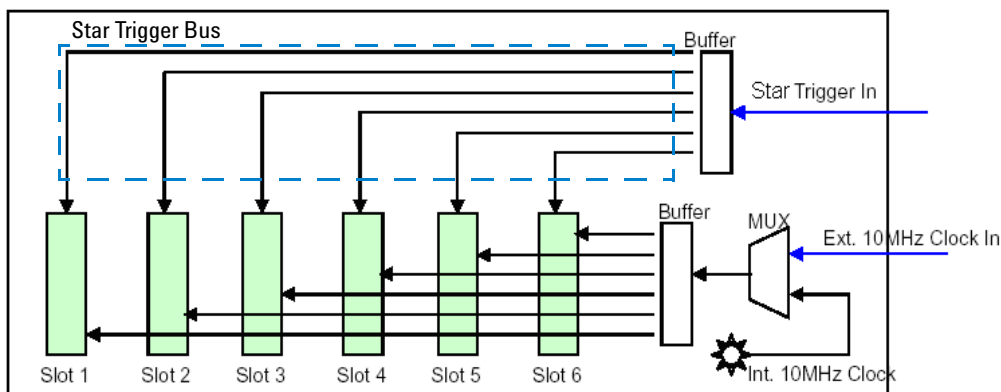

Figure 2-3   Block diagram of the 10 Mhz Reference Clock and External Trigger In

Simultaneous Synchronization (SSI)

Simultaneous Synchronization (SSI) provides synchronization between the modular products within the chassis. Figure 2-4 illustrates an example of SSI. The SSI feature should be configured using the bundled Agilent Measurement Manager (AMM).

SSI allows users to set the modules as MASTER or SLAVE. The MASTER module sends the SSI signal to the slave modules via the backplane trigger bus (TRIG [0..7]). SLAVE modules will then receive the signal and begin synchronization with MASTER module.

There are two SSI configuration modes available — single Master–multiple Slaves and multiple Masters–multiple Slaves.

NOTE	• Only ONE master can be assigned for U2300A, U2500A, and U2600A Series.
	• For more information, refer to the *AMM Help File,* Chassis Trigger page.
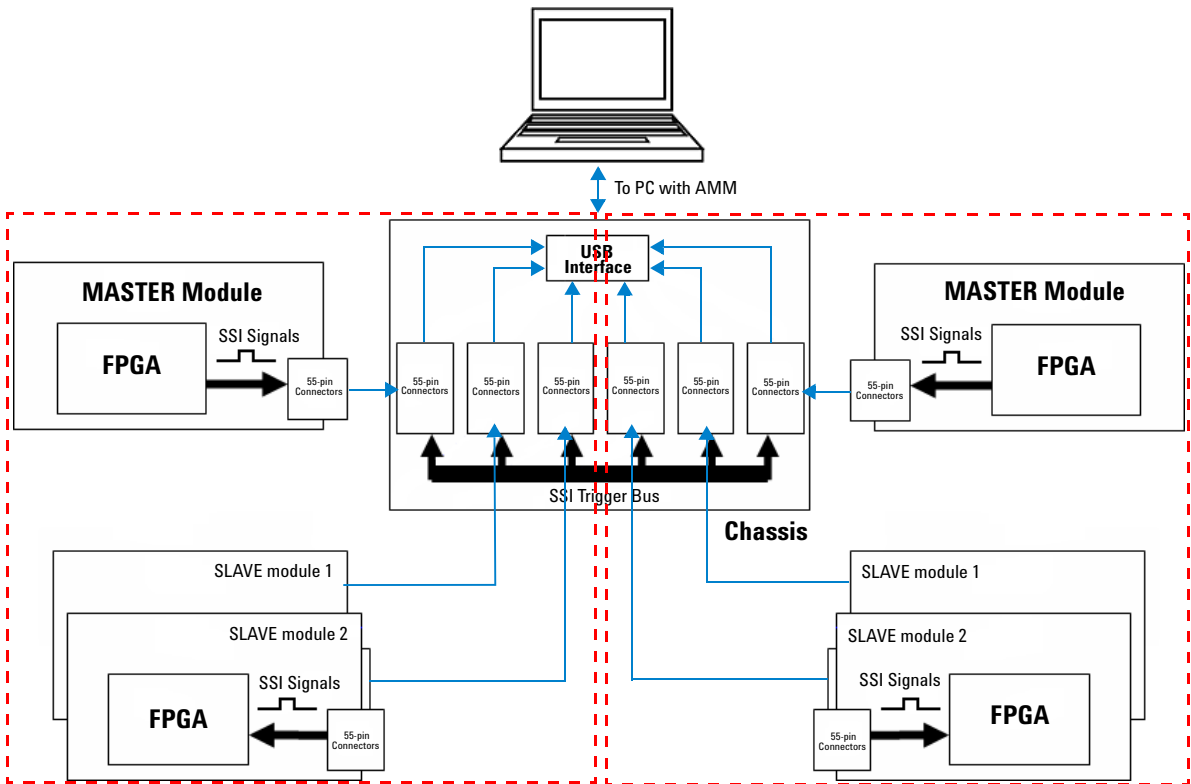
Figure 2-4   Synchronization between modules in the chassis

Single Master–multiple Slaves

In this configuration, only one Master module is allowed to send the SSI trigger event to the receiving Slave modules.

Configuration with Agilent U2300A, U2500A, and U2600A Series DAQ only

When there is one or more U2300A, U2500A, or U2600A Series DAQ in the SSI configuration, SSI allows users to set only one of the modules as MASTER and others as SLAVE through AMM. Alternatively, users can also set this configuration using the SCPI commands.

NOTE   Refer to *U2300A, U2500A, and U2600A Series DAQ Programmer's Reference.*
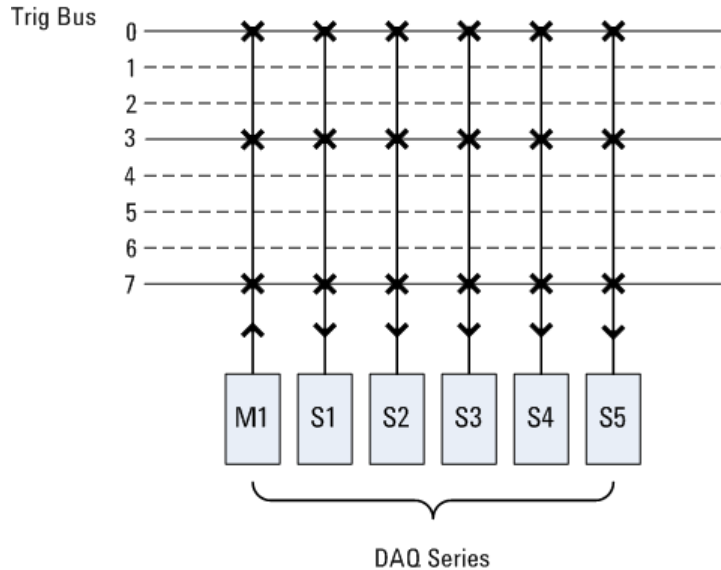
Figure 2-5   Single Master–multiple Slave triggering with DAQ

Configuration with combination of Agilent U2300A, U2500A, U2600A Series DAQ and U2700A Series modular products

With one DAQ configured as Master, all of the other U2700A Series modular devices can only be configured as Slave to receive the event of the signal as shown in Table 2-2.

Figure 2-6   Single Master–multiple Slave triggering

Table 2-3 shows some examples of supported and not supported configurations.

Table 2-3 Example of configurations for single Master-multiple Slaves using DAQ and U2700A Series modular products.

	Slot 1	Slot 2	Slot 3	Slot 4 & Slot 5	Slot 6
	DAQ	U2701A/U2702A	U2761A	U2722A	DAQ
Supported configurations					
Configuration 1	M = T0 – T7	S = T0	S = T3	S = T7	S = T0 – T7
Configuration 2	None	M = T1	S = T1	S = T1	None
Configuration 3	M = T0 – T7	None	None	None	S = T0 – T7
Not supported configurations					
Configuration 1[1]	M = T0 – T7	M = T1	S = T1	S = T2	None
Configuration 2[2]	S = T0 – T7	M = T1	S = T1	S = T2	None
Configuration 3[2]	S = T0 – T7	M = T1	S = T1	S = T1	None
Configuration 4[2]	S = T0 – T7	M = T0 – T7	S = T0	S = T0	None

M — Master, **S** — Slave, **T0~T7** — Trigger bus (TRIG [0..7]), ***** — Star Trigger

[1] Multiple Master is not allowed with DAQ set as Master.

[2] U2700A Series modular devices should not be configured as Master.

Multiple Master–multiple Slaves

In this configuration, groups of single Master-multiple Slaves are allowed in order to perform multiple synchronizations simultaneously. This configuration is only supported by U2700A Series modular products.
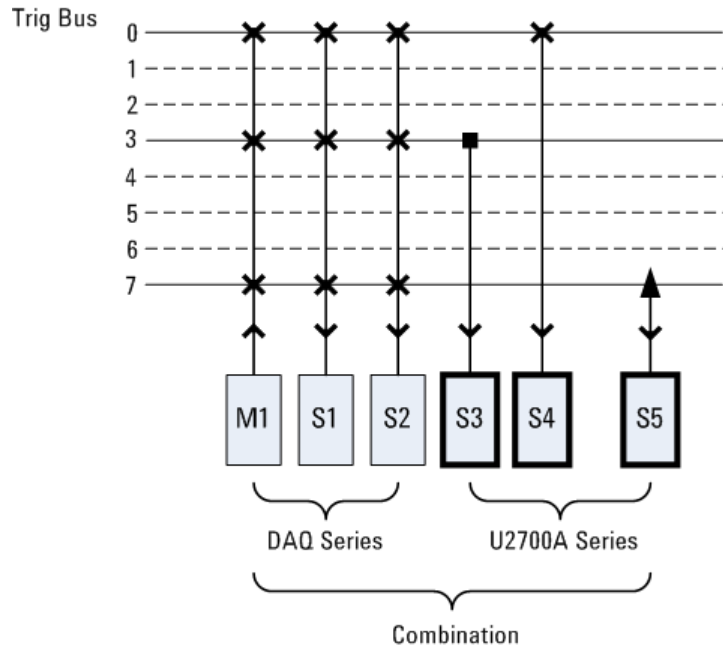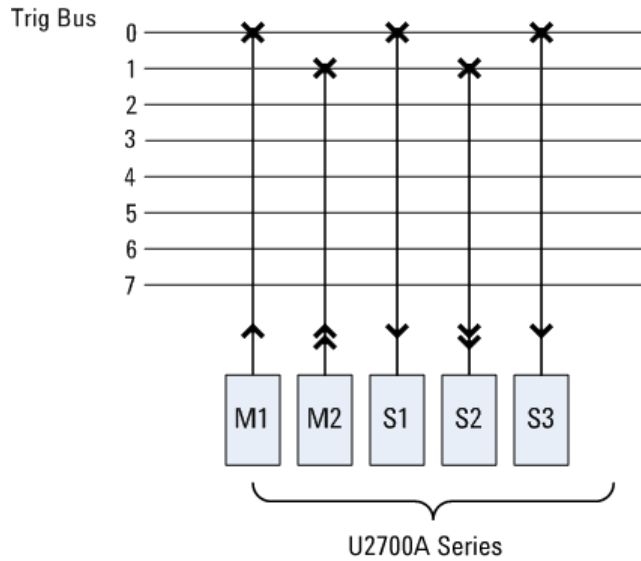

Figure 2-7   Multiple Master–multiple Slave triggering

Table 2-4 shows some examples of supported and not supported configurations. Example of configurations for multiple Master–multiple Slaves.

Table 2-4   Example of configurations for multiple Master–multiple Slaves

	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5 & Slot 6
	U2701A	U2702A	U2761A	U2751A	U2722A
Supported configurations					
Configuration 1	M = T0	S = T0	S = T0	None	S = T0
Configuration 2	S = T1	M = T1	None	None	S = T1
Configuration 3	M = T0	M = T1	S = T0	None	S = T1
Configuration 4	*(Out) M = T1	S = T1	* (In)	None	S = T1
Configuration 5	*(Out)	* (In)	* (In)	None	* (In)
Not supported configurations					
Configuration 1[1]	M = T0	M = T0	S = T0	None	S = T0
Configuration 2[2]	M = T3	S = T3 S = T4	M = T4	None	S = T4
Configuration 3[3]	M = T0 S = T1	S = T0	S = T0	None	S = T1
Configuration 4[4]	*(Out) M = T1	* (In) S = T1	None	None	None

M — Master, **S** — Slave, **T0~T7** — Trigger bus (TRIG [0..7]), ***** — Star Trigger

[1] Same trigger line is not allowed for multiple Master configuration.

[2] Slave device not allowed to occupy two trigger lines.

[3] Not allowed to have both Master and Slave configuration for a device.

[4] Not allowed to have Star Trigger and Slave mode for a device.

System Reference Clock

The 10 MHz reference clock can come from two sources; internal backplane oscillator and external clock source.

The internal oscillator on the USB backplane supplies an independent 10 MHz system reference clock to each of the USB slot. This 10 MHz reference clock is driven through an independent buffer. Refer to Figure 2-3 for the block diagram. Every clock trace is in equal distance to ensure that the distance of the slot to the slot skew is minimized. Users can use this common reference clock signal to synchronize multiple modules in a measurement or control system.

The default SCPI command of `ACQuire:RSIGnal AUTO` will scan through and detect if there is any valid clock source from the external BNC connector. If none is found, then the internal 10 MHz clock source will be used.

The SCPI command below will direct the reference clock source to the internal 10 MHz:

```
ACQuire:RSIGnal INT
```

Chassis Temperature Monitoring

The chassis contains a temperature control circuitry. It has two thermistor sensors to sense the inner temperature of the chassis. The temperature control circuitry communicates with backplane USB device through an I^{2}C interface as illustrated in following figure.
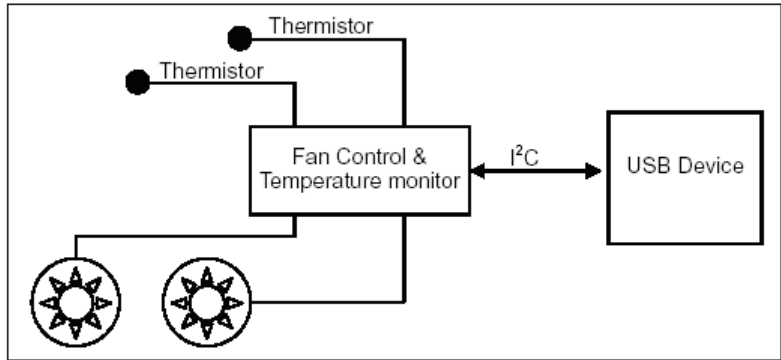
Figure 2-8   Block diagram of temperature monitoring and fan control

The SCPI command below queries the temperature reading from the sensors in degree Celsius (°C):

```
SYSTem:TEMPerature? {1|2}
```

Fan Speed Monitoring

The U2781A USB modular instrument chassis is also integrated with a fan speed control circuit. It is used to monitor the fan status and speed. The control circuit communicates with backplane USB device via I^2C interface. Refer to Figure 2-8.

To query the fan status, send the SCPI command below:

```
SYSTem:FSTATus? {1|2}
```

To query the fan speed in revolutions per minute (rpm), send the SCPI command below:

```
SYSTem:FSPeed? {1|2}
```

Identifying Modules Location

Geographical Address

Each slot in the chassis is designed with a 3-bit address pin, which is designated as a location identity for USB modules. The address for all six slots are as below:

Slot	Address
1	001
2	010
3	011
4	100
5	101
6	110

The USB modules are able to read this 3-bit data and know which slot the module is plugged in. To read the geographical address of each module, the SCPI command below is used:

```
SYSTem:CDEScription?
```

Modules Identification

You may have more than one module or chassis connected to the same host PC. The following figure illustrates an example of the connection.
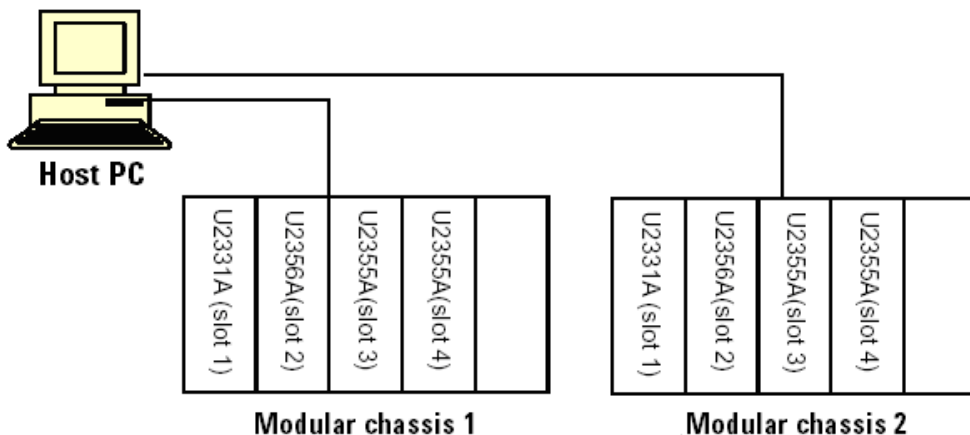
Figure 2-9   Identifying modules location

To identify the location of the modules, a pre-configuration setting is needed before the synchronization or triggering event begins. Follow the steps below:

1 Send the following command to the modular chassis to trigger it. This command will be used to transmit the number to all USB modules via Trigger Bus (TRIG [0..7]). You can choose from 0 to 255 for your chassis number.

   ```
   SYSTem:IDentity {0|1|2|3…|255}
   ```

NOTE   Select 0 to disable the output. The modular chassis will not be triggered to send any output to the USB modules.

2 Send the following command to every module in the chassis to query each of the slot and chassis numbers.

   ```
   SYST:CDES?
   ```

3 You may need to perform some sorting routine to determine which slot it is at and what is the assigned number of its host chassis. If a chassis has six modules in

it, then there will be a total of seven SCPI commands to send to chassis and modules.

4 During this identification operation, the trigger bus is used. Hence, any triggering activities on the backplane would be blocked.

5 Prior to any triggering activities, you must stop the configuration activity by sending the following command:

```
SYSTem:IDentity {0|OFF}
```

NOTE	• Do not execute the above mentioned steps when the USB modules are in the process of acquiring data.
	• You do not need to perform the above pre-configuration if you are using the Agilent Measurement Manager software. You are only required to press the "Refresh" button.

3
Characteristics and Specifications

This chapter specifies the characteristics, environment conditions, and specifications of the U2781A USB modular instrument chassis.

Product Characteristics

REMOTE INTERFACE
- Hi-Speed USB 2.0
- USBTMC Class Device[1] [2]

POWER CONSUMPTION
- 400 VA maximum
- Installation Category II

OPERATING ENVIRONMENT
- Operating temperature from 0 °C to +55 °C
- Relative humidity at 15% to 85% RH (non-condensing)
- Altitude up to 2000 meters
- Pollution Degree 2
- For indoor use only

STORAGE COMPLIANCE
–20 °C to 70 °C

SAFETY COMPLIANCE
Certified with:
- IEC 61010-1:2001/EN 61010-1:2001 (2nd Edition)
- USA: UL61010-1: 2004
- Canada: CSA C22.2 No.61010-1:2004

EMC COMPLIANCE
- IEC/EN 61326-1 1998
- CISPR 11: 1990/EN55011:1991, Class A, Group 1
- CANADA: ICES-001: 1998
- Australia/New Zealand: AS/NZS 2064.1

ACOUSTIC EMISSION
- Sound pressure level: 45.5 dB(A)
- Sound power level: 56.6 dB(A)

SHOCK & VIBRATION
Tested to IEC/EN 60068-2

DIMENSION (WxDxH)
270.00 mm x 271.20 mm x 197.00 mm

WEIGHT

3.7 kg (without any modules slotted in)

WARRANTY

Please refer to http://www.agilent.com/go/warranty_terms
- Three years for the product
- Three months for the product's standard accessories, unless otherwise specified

Please take note that for the product, the warranty does not cover:
- Damage from contamination
- Normal wear and tear of mechanical components
- Manuals

1   Compatible with Microsoft Windows operating systems only.

2   Requires a direct USB connection to the PC so the appropriate driver can be installed in the USB modular instrument or USB DAQ module.

Electrical Specifications

Power Supply AC Input	
Input voltage range	100 to 240 VAC
Input frequency range	50 to 60 Hz
Power consumption	400 VA maximum
Efficiency	75%
Power Supply DC Output	
Output rated voltage	12 VDC
Max output rated current	16.7 A
Max output rated power	200 W
Over voltage protection	13.2 to 16.2 V

Internal 10 MHz Reference Clock	
Accuracy	25 ppm for operating range
Slot to slot skew	350 ps
External 10 MHz Reference Clock	
Auto detection level	Yes
Input frequency range	10 MHz
Input magnitude	100 mVpp to 5 Vpp (sine/square wave)
Input impedance	$50 \, \Omega \pm 5 \, \Omega$
Damage level	10 Vrms
External Trigger In	
Compatibility	TTL
V_{IH} (Positive threshold voltage)	2.0 V
V_{IL} (Negative threshold voltage)	0.8 V
Hold time	8 ns pulse width
Input voltage range	0 to 5.0 V
Slot to slot skew	350 ps
External Trigger Out	
V_{OH}	2.9 V
V_{OL}	0.1 V
Output voltage range	0 to 3.3 V

Mechanical Specifications

Physical Layout	
Number of USB module slots	6
Dimension of each module slot	25.40 mm (W) x 174.54 mm (D) x 105.00 mm (H)
Dimension of chassis	270.00 mm (W) x 271.20 mm (D) x 197.00 mm (H)
Weight	3.7 kg
Power LED	ON/OFF type
USB Backplane	
Connector	55 pins Ernet male type C
Input signals	External 10 MHz clock in (BNC connector)
	External trigger in (BNC connector)
Output signal	Trigger out (BNC connector)
Cooling Fan	
Number of fans	2
Fan speed	3300 rpm ±10%
Noise	37 dB(A)
Power (each fan)	2.52 W

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Contact us

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Product specifications and descriptions in this document subject to change without notice. Always refer to the English version on the Agilent Web site for the latest revision.

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