Table of Contents

DISplus

Diagnosis and Information Systems

Equipment: DISplus

Objectives:

After completing this module you should be able to:

• Compare and contrast the functions performed by the DISplus.

• Understand how to establish communication between the Diagnostic Head and the DISplus.

• Describe what components and connections establish a workshop LAN.

• Recognize the measurements and tests possible with the DISplus Measuring Systems.

DISPLUS
Powerful Reliable User-Friendly

Purpose of the system

The DISplus is the successor to the original DIS (*Diagnosis and Information System*) introduced in 1994.

The purpose of the DISplus is to provide a technical up-grade over the previous DIS, and meet the challenges for the next generation of BMW group vehicles, e.g. E65.

The functions of the DISplus that are similar to the previous DIS are:

• Technical Information System (TIS)
• Diagnosis Program
• Measurement Techniques
• Coding Program

As a further advantage over the DIS, the DISplus has Network capability, along with being prepared for future information media (Internet browser, Acrobat™ reader etc.).

Specifications

• 500Mhz Intel Pentium™ III processor
• 128MB RAM
• 13.6 GB hard drive
• DVD drive
• Sound card with 2 speakers
• Network card for LAN connection (connected into the Service Department network)
• Additional SVGA output for connection to an external monitor
• 15" TFT touch screen monitor
• Vehicle communication via a diagnostic head (Radio frequency)

Components no longer supported from the previous DIS are:

• Label printer (top drawer)
• MoDiC II download station (second drawer)
• Infrared printer interface

System Components

Monitor

The DISplus uses a 15" TFT (Thin Film Transistor) monitor. It has a pressure sensitive touch screen controller to direct the curser movement.

The monitor is attached to the DISplus by a 15' cable that allows it to be used either on the swivel stand or remotely, e.g. inside of a vehicle.


ON

OFF
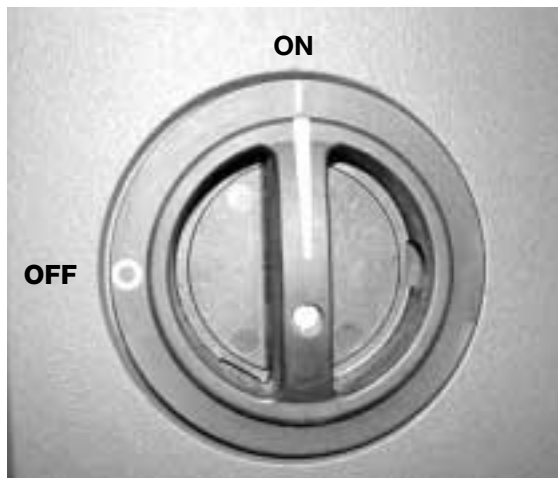
Main Power Switch

The main power switch is located in the upper right hand side, at the rear of the DISplus.

The main switch is turned on first, before turning the DISplus on from the front panel. The System Status LED on the front panel should illuminate amber when the main power has been turned on (see lower left illustration).

Circuit breakers are located below the DISplus computer. If the unit fails to power-up, check the reset of the circuit breakers before calling for service.

System Status LED

Circuit Breaker

Diagnosis and Information Systems
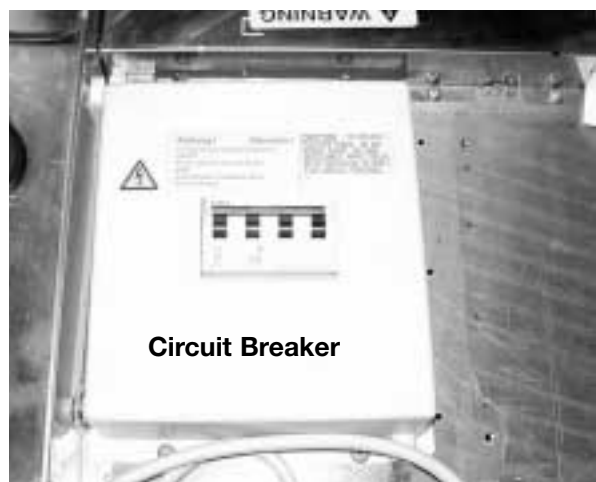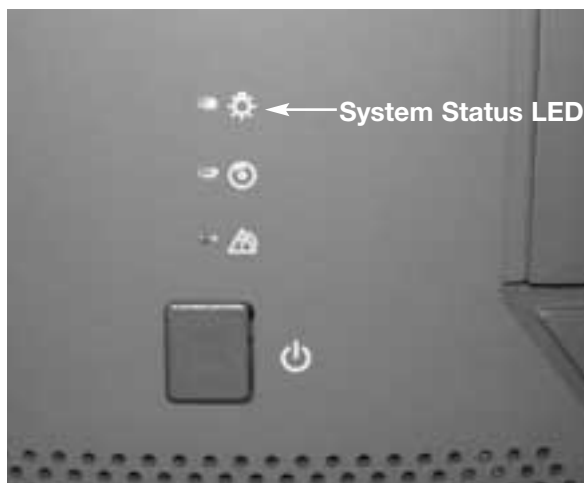
System Indicators and ON/OFF Button

After the main power switch has been turned on, the DISplus is powered up by pressing the ON/OFF button on the front panel.

During power up, LED 2 will illuminate. When the process is complete, the System Status LED changes from amber to green.

The fault indicator, LED 3, illuminates amber when there is a fault with the DISplus.

LED 1	System Status
LED 2	Hard Drive active
LED 3	Fault indicator
	ON/OFF button
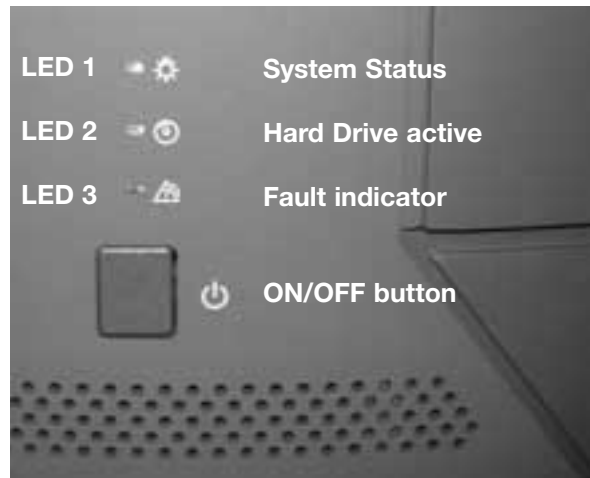
DVD and 3.5" Floppy Drive

The DVD and Floppy drives are located behind a door on the right side of the unit.

The Floppy drive is used for the boot-up disk when loading the Diagnosis Program.

The DVD drive is used to load the Basis and Program CDs for Diagnosis.

The TIS CD is also loaded in the DVD drive and remains in the drive for the computer to access during TIS operation.

RF Access Point

The access point is the transfer device between the hardwired LAN network and the radio frequency assisted LAN.

The DISplus is connected to the access point via a network LAN cable. The access point then communicates with the Diagnostic Head using a radio frequency LAN link.

See Workshop Network Connection (pg. 12) for more details concerning networking.

Diagnostic Head

The DISplus uses a Diagnostic Head similar to the MoDiC III as the communication link between the DISplus and the vehicle electronics.

The Head receives operating power when the diagnosis cable is connected to the vehicle.

Communication between the DISplus and the Head can occur two ways:
• Radio frequency (maximum 30m distance)
• Hard wired to the network or DISplus

Measurement Jacks for signal recording

Hardwire connection for network communication

TD Cable input (for measurements)

Diagnosis cable input

Temperature warning LED (Red)

Communication LED (amber)

Power supply LED (green)
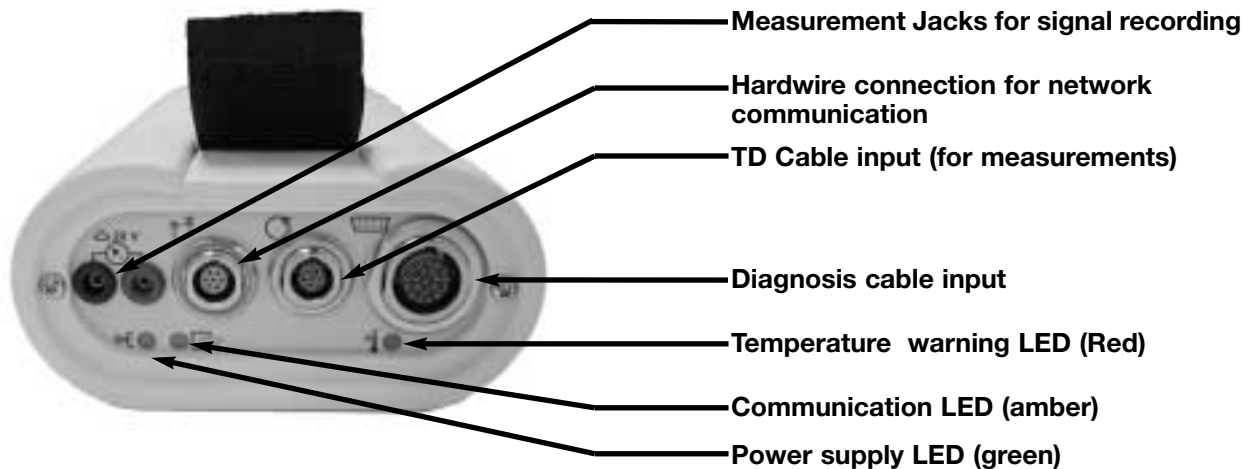
Signal recorder button (currently not used)

Serial interface connection
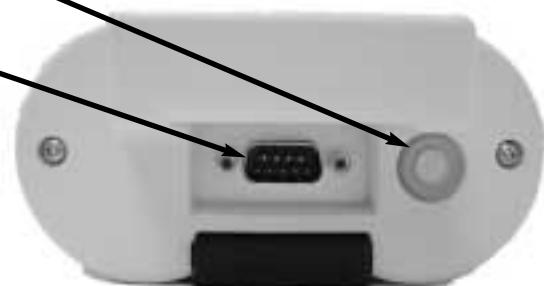
DISplus Cables and Leads

MFK 1

Multi-Function Cables

Workshop LAN Connection

TD Cable
(Plugs into Diagnostic Head)

MFK 2

System input & Stimulation Output

System Input Only

Stimlation Output Only

Trigger Clip

1000 Amp (inductive) Probe

Secondary Ignition Test Lead-Used with Secondary Ignition adapter Kit 12 7 040

DISplus Diagnostic Head and Leads
(20 pin or 16 pin OBD)

Pressure Sensor 0-25 Bar Reading

25

Secondary Ignition-Inductive Clip
Used on Vehicles with Ignition Distributors

DC Circuit Breaker Cable (Stimulation Output)

Temperature probe

BMW DIS

Diagnostic Cable

20 and 16 pin cables are provided for connection between the vehicle diagnostic socket and Diagnostic Head.

16 pin OBD II connector   **20 pin underhood connector**

Test Cables

Various test cables and the main power cable are connected to the rear of the DISplus through the conduit channel of the cable arm mast. The following test cables are stored on the arm.

LAN (Local Area Network) Connection

The LAN connection has the appearance of a large phone receptacle. It provides the connection for the DISplus to the Ethernet wiring for the Service Department Network.

TD (RPM input) Cable

The TD input cable is used for specific Test Modules that require a hard wired RPM input for measurement functions.

TD cable connected to Diagnostic Head

**Multi-Function Test Cable-MFK #1
(two cable ends)**
MFK 1 is used to measure:
- Voltage - up to 50 Volts
- Current - up to 2 Amps
- Resistance
- Diode Testing
- Frequency
- Period
- Duty Cycle
- Pulse Duration
- Oscilloscope Measurements

**Multi-Function Test Cable-MFK #2
(Four cable ends)**
MFK 2 is used to measure:
- Voltage - up to 500 Volts
- Frequency
- Period
- Duty Cycle
- Pulse Duration
- Oscilloscope Measurements

Both MFK 1 and MFK 2 can be used for signal outputs from the Stimulate Output function of the Multimeter. On MFK 2, the two large cable ends are for input only (measuring) and the two small ends are for the Stimulate Output function. MFK 1's leads are for both measuring and stimulation.

Both large positive cable ends of MFK 1 and 2 include a button used to hold the measured value on the display screen.

Freeze Button
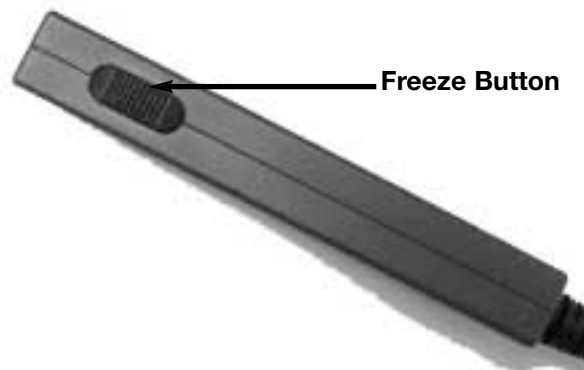
Trigger Clip (inductive)

The trigger clip is used when testing ignition or fuel injection systems to establish engine firing order.

Additional Test Cables

There are additional test cables connected to the rear of the DISplus on the measurement system board. The ends of the cables are color-coded for easy identification.

1. **1000 Amp probe**

2. **50 Amp probe**

3. **Secondary Ignition Clip**

4. **Temperature Sensor**

5. **DC Circuit Breaker**

6. **Pressure Sensor 1**

7. **Pressure Sensor 2**

8. **Future Use**

Secondary Ignition Test Cables

The inductive clip (1) is used when checking Secondary Ignition on vehicles that use a Distributor. It is clipped to the vehicle's distributor wire. The Flat lead (2) is used in conjunction with the secondary ignition adapter test kit (#12 7 040) when checking vehicles that have a Static Ignition system.

1000 Amp Probe

The 1000 Amp probe measures AC and DC current from 0 to 1000 Amps. It is a self calibrating, inductive pick-up.

Temperature Sensor

The long temperature probe measures the temperature of liquids and gasses. The measurement range is from -20°C to 200°C.

Pressure Sensor

The Pressure Sensor measures from 0 to 25 bar. There are two pressure inputs to the measuring unit that permit two different pressures to be measured simultaneously if two Sensors are used.

DC Circuit Breaker Cable

The DC circuit breaker is used in the Stimulate Output function to provide a DC power switch with circuit protection. It is used for testing circuits and components.

Workshop Network Connection

The DISplus has the ability to be integrated into an existing workshop computer network. Networking allows the DISplus to be connected to the same server as the DCS 2000 system.

Having all of the BMW centers diagnosis equipment on a network, provides BMW with a method of immediate retrieval of data from vehicle systems that are being diagnosed in the workshop.
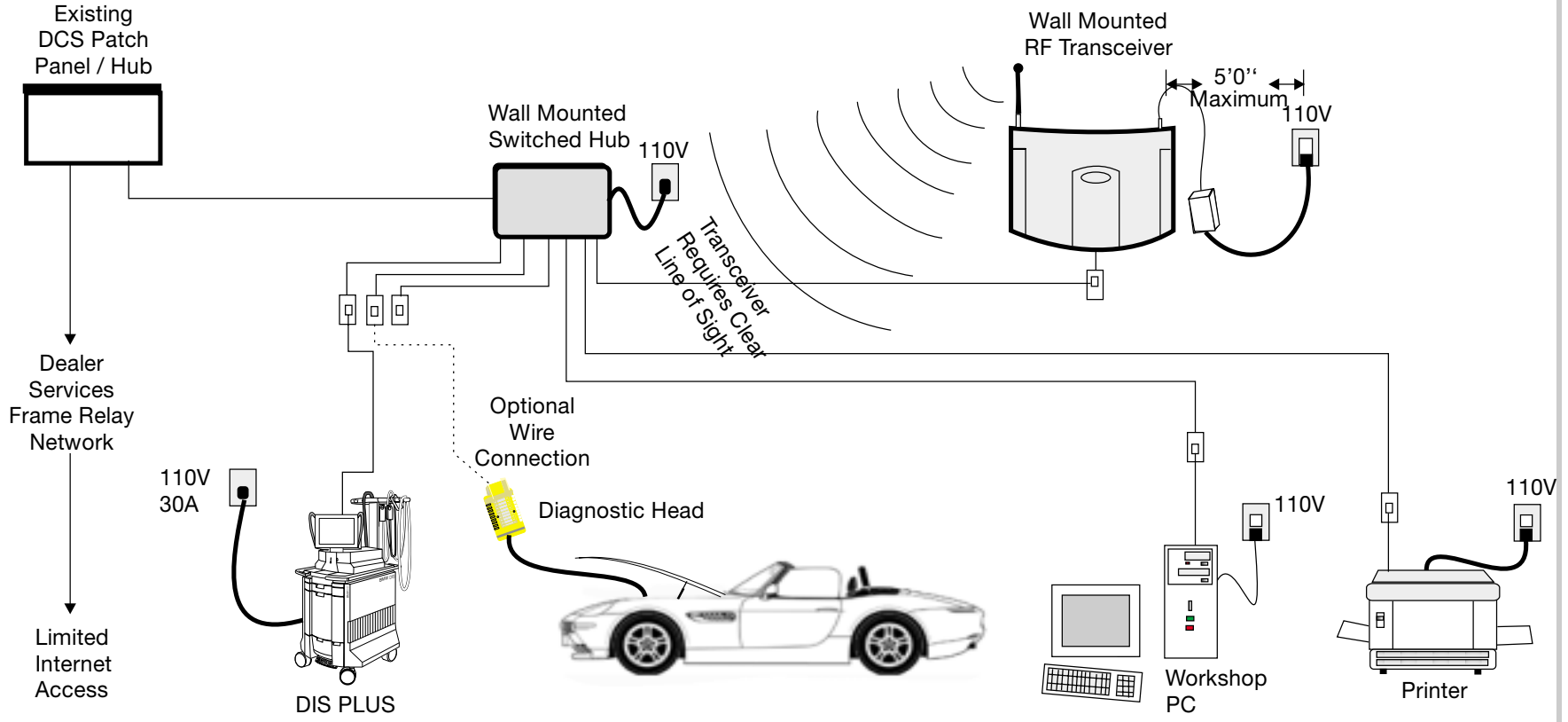
The benefits are, to provide BMW with a better, more complete and in-depth understanding of diagnostic problems and the conditions of diagnosable systems. Also, this information will be used by the Hotline and by Service Engineering to support BMW centers, as well as for product improvement and development.

In addition to reporting, the DISplus will add a web browser feature. This will enable technicians to toggle over to the internet and view information on the technical website.

The Workshop Network consists of:
• DISplus
• Ethernet drop from the BMW center's DCS 2000 LAN
• Switched hub
• Ethernet Access point with RF transceiver
• Diagnostic bay(s) wired with 3 Ethernet 10base-T connections
• Technical Reference PC (located in the workshop)
• Network Printer: Lexmark M410N post script printer
• I/P address for each device on the Ethernet

Example Workshop Network

Existing
DCS Patch
Panel / Hub

Wall Mounted
RF Transceiver

5'0''
Maximum

110V

Wall Mounted
Switched Hub

110V

Transceiver
Requires Clear
Line of Sight

Dealer
Services
Frame Relay
Network

110V
30A

Optional
Wire
Connection

Diagnostic Head

110V

110V

Limited
Internet
Access

DIS PLUS

Workshop
PC

Printer

Network Terms Defined

Ethernet

Originally developed by Xerox™, Ethernet is the most widely used *LAN* technology. An Ethernet *LAN* typically uses coaxial cable or twisted pair wiring. The most common Ethernet systems are called *10base -T* and provide transmission speeds up to 10Mbps.

Internet Protocol (I/P) Address

An Internet Protocol address is a binary number that identifies each sender or receiver of information that is sent across the internet or LAN. The I/P address is usually expressed as four decimal numbers, each representing eight bits, separated by periods i.e. 192.168.68.20. The numbers and their sequence provide information to the Network about which specific device or *Host* is sending or receiving a message.

Local Area Network (LAN)

A local area network is a group of computers and devices that share a common communications line and may share the resources of a single server within a small geographic area i.e. within a Dealership. Shared programs can be kept on the LAN server and be accessed by individuals on the LAN. Also, for example, users can order printing from one centrally located printer attached to the LAN.

10base-T

Most Ethernet wiring uses ordinary twisted pair phone line to transfer data within a LAN. The designation, 10base-T is an Institute of Electrical and Electronics Engineers shorthand. "10" refers to the transmission speed of 10Mbps (megabits per second). Base means that only Ethernet signals are carried on the line. "T" represents twisted pair. There are other media used to transfer Ethernet signals that can use coaxial cable or fiber optical cable.

Diagnosis and Information Systems

Establishing a Connection With the Diagnostic Head

- Attach the diagnostic cable to the head. The cable will only fit in the correct socket.

    Note:
    Use the correct cable according to the type of diagnosis socket that the vehicle has (16 pin OBD II or BMW 20 pin under the hood).


- Connect the diagnostic cable to the vehicle.

- Turn on the ignition.

- As a test, all three LEDs will illuminate. The green LED should stay illuminated to indicate that the head is receiving operating power.

- The amber LED will flash until a connection to the DISplus can be established.

- As soon as the LAN connection with the DISplus is established, the flashing amber LED will change to a steady light.

- Connection to the Diagnostic Head of the DISplus can be confirmed and created from the **"Connection Setup"** screen of the Administration page.

- If Radio-LAN communication with the Diagnostic Head is not possible, a hardwire cable connection may be made.

- Connect the DK LAN cable as shown in the illustration (orange connector).

- On the DISplus, disconnect the SE LAN cable (the one connecting the DISplus to the network). Connect the other end of the DK LAN cable (that looks like a phone connector) to the DISplus LAN receptacle.

DK LAN Cable

- Restart the Head by briefly disconnecting and connecting it to the vehicle to initialize communication.
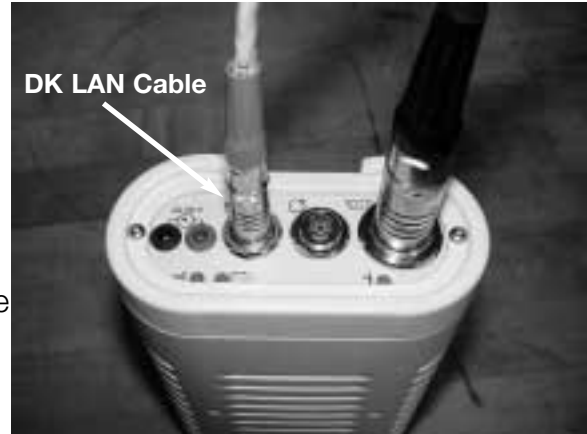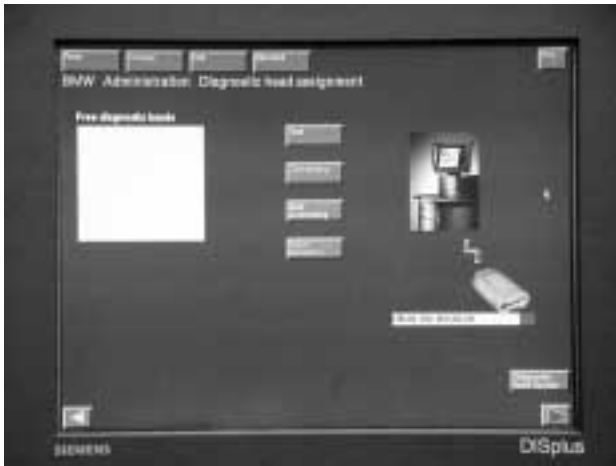
Connection Setup (Administration)
When a Diagnostic Head is first introduced to the DISplus or a connection has been lost, the LAN link may be established using the Connection Setup screen from the Administration menu. To enter the Administration page, select the "Administration" button from the main start screen.
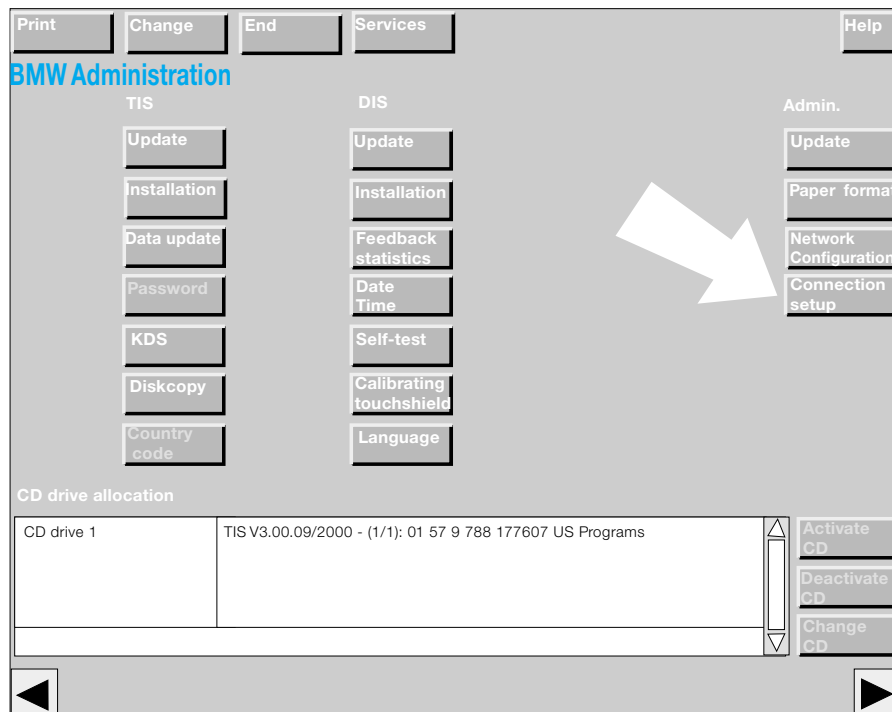
Administration Menu

- Once inside the connection setup page there will be a box on the left side called "Free diagnostic heads"

- Any Heads that are powered up and not currently assigned to a DISplus will be found and listed in the box. Each head has its own I/P address for identification to the DISplus.

- With the correct Diagnostic Head identified, press the "Connecting" button to establish the connection.

- Once the radio LAN link is established, the DISplus will only be able to communicate with that head. If the use of another head is desired, press the "Quit Connecting" button from the same page. This breaks the link. Repeat the process for selecting and connecting as previously described.

Checking the Operation LED Indicators of the Access Point
If communication between the Diagnostic Head and the DISplus is faulty, the LEDs on the access point may help to determine where the problem is. The indicators operate as follows:


1. **Status LED**: During normal operation the LED flashes once per second.

2. **Serial LED:** Flashes during activity at the serial interface.

3. **Cable LAN connected LED:** "ON" indicates a valid Ethernet LAN connection.

4. **Cable LAN active LED:** Flashes when data is being transmitted via the LAN.

5. **Radio LAN connected LED:** Lights up when there is an established connection between the Diagnostic Head and the access point

6. **Radio LAN active:** During connection setup and when data is being transmitted by the Diagnostic head, this LED flickers.

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DISplus Program Overview

DIS Start Screen
The first steps to troubleshooting and diagnosis using the DISplus begin at the DIS start screen.

1. **Print Button**

2. **Change Button**
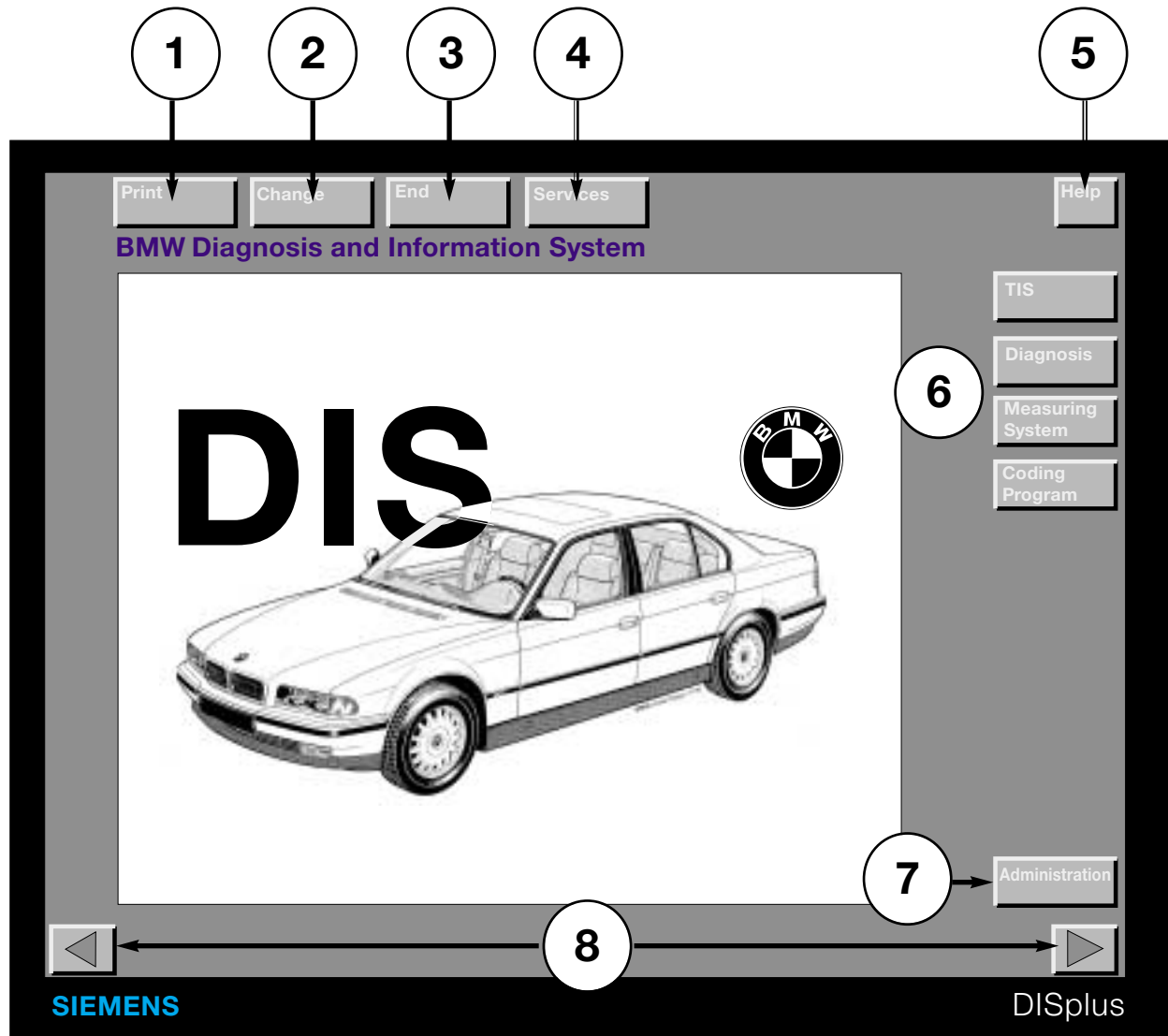
3. **End Button**

4. **Services Button**

5. **Help Button**

6. **Program Selection Buttons**

7. **Administration Menu Button**

8. **Navigation Buttons (Forward and Backward)**

Function Buttons (pull down menus)

The Print button allows the user to pull down a menu of print options.

Print
Shield
Diagnosis report
Feedback
Label
Documents
Printer reset
Test code
Stored diagnosis rep

- **Shield** prints the entire screen as it is being displayed.

- **Diagnosis report** prints the diagnosis report at any time while it is being compiled by the diagnosis program.

- **Feedback** prints the report entered using the technician feedback report entry screen.

- **Label** permits printing a test code or vehicle coding label. The correct adhesive labels or paper must be used in the network printer. The label printer in the top drawer of the DISplus is no longer used.

- **Documents** prints the entire reference document (i.e. ETM, Pin Assignment, etc).

- **Printer reset** clears the printer spool of unprinted documents. This helps to speed up the print process by deleting unwanted documents.

- **Test code** prints the stored test code on a full sheet of paper.

- **Stored diagnosis report** prints any diagnosis reports that have been stored but not printed. Once printed, the reports are deleted from memory.
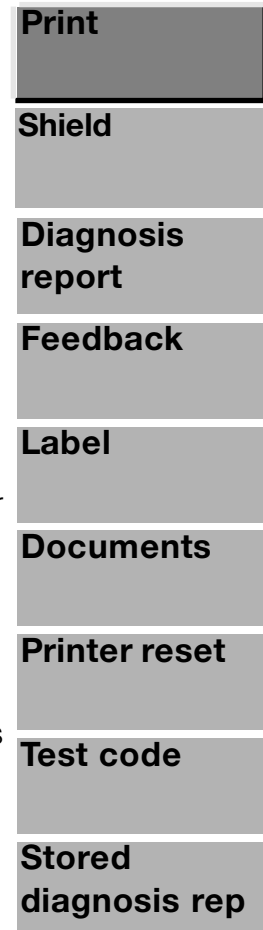
Note: Most of the print menu items do not function until data has been stored during the diagnosis process.

Change
TIS
Diagnosis
Measuring system
Coding/ Program.
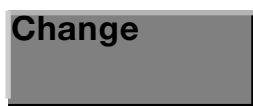
Change allows the user to switch to other programs installed in the DISplus without returning to the DIS start screen.

Some programs cannot be entered until the task in the current program is finished (i.e. coding completed before returning to diagnosis).
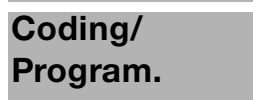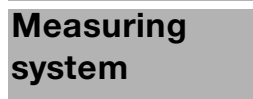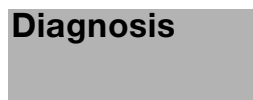
The **End** function offers the user several options for stopping a current running program.

End

- **Break** allows the program to be paused or interrupted without losing any information or stored data about the currently running test module. The data may be stored on a floppy disc or the hard drive and can be recalled by selecting the **Job** button from the Diagnosis start menu.

Break

Cancel

- **Cancel** terminates the running program and returns to the currently running programs start screen i.e. TIS or Diagnosis.

Quit

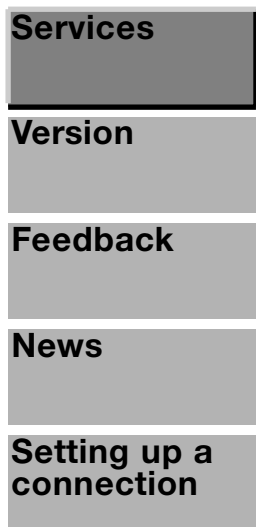- **Quit** terminates the current running program and returns to the DIS start screen.

Services

The **Services** button offers administration functions as follows:

Version

- **Version** displays the current operating software.

Feedback

- The **feedback** function allows the user to report back on problems concerning the diagnosis program. An electronic keyboard on the screen is used to type in what the problem is. This information can be printed out and sent to BMW.

News

- **News** presents a summary of new features or functions available on the installed software version.

Setting up a connection

- **Setting up a connection** is a shortcut to the administration feature used to connect and disconnect communication with the radio frequency Diagnosis Head.
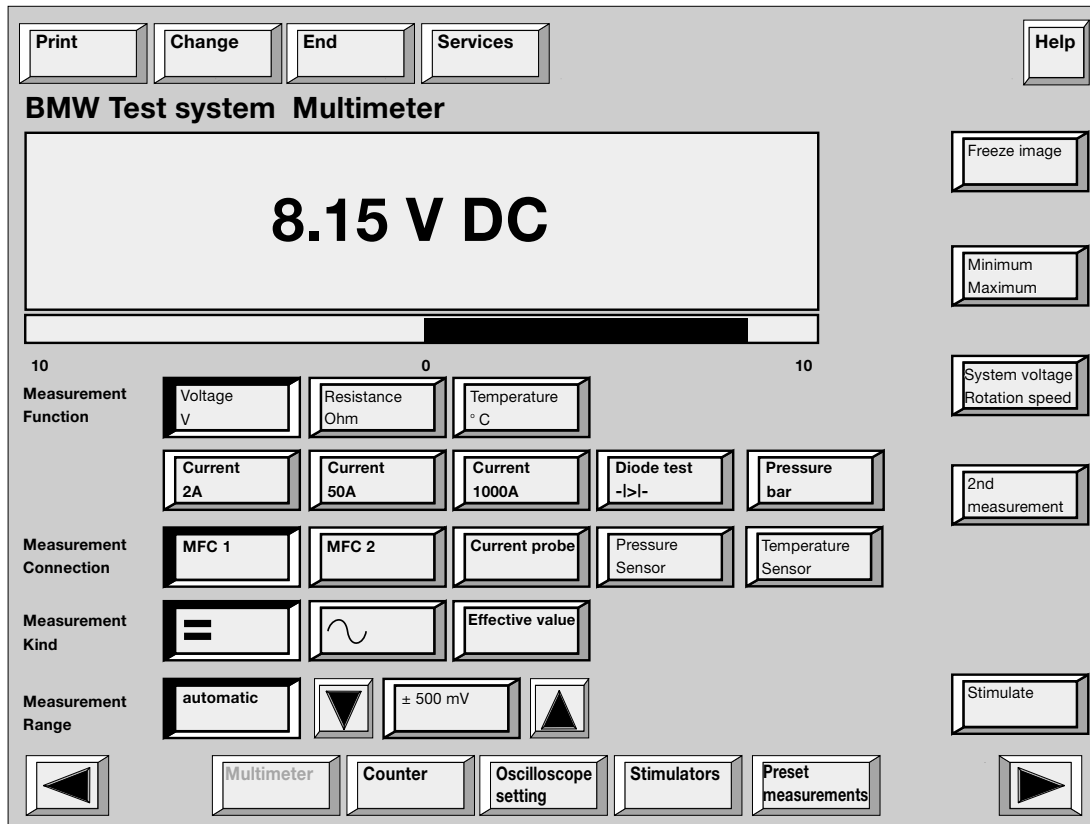
The **Help** function is available in all screens and provides the user with help information on the currently running program or function.

Help
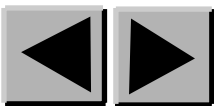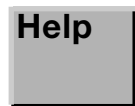
Navigation Buttons: These buttons serve different functions in the various programs. However, they generally allow the user to page forward or backward in the currently running program.

DISplus Programs

TIS

Pressing the **TIS** button from the DIS Start Screen will launch the TIS application and allow access to all of the available TIS functions.

Please refer to the Information Resources chapter for a review of the TIS program.

Diagnosis

Pressing the **Diagnosis** button will call up the diagnosis program. The functions available in the program are:

• Expert Mode diagnosis for models prior to the E38 introduction.
• Diagnosis with the E38 diagnostic concept program.
• Diagnosis with the E46 diagnostic concept program.
• ETMs in the Diagnosis Program.

Refer to the module titled E46 Diagnostic Concept for a review of the Diagnosis Program.

Coding Program

Pressing the **Coding Program** button will bring up a menu of different coding applications. The programs contained are:
• Car Memory
• Key Memory
• ZCS Coding
• Programming (drivetrain modules)
• EWS Alignment

BMW Coding/programming SELECTION

1 CAR MEMORY
2 KEY MEMORY
3 ZCS CODING
4 PROGRAMMING
5 ALIGNMENT EWS-DME
6 ALIGNMENT EWS-DDE

Car and Key Memory Programming is discussed in the Service and Maintenance chapter.

Measurement system

Pressing the **Measurement system** button from the DIS start screen will call up the Multimeter function.

| Print | Change | End | Services | | Help |

BMW Test system Multimeter

8.15 V DC

Freeze image

Minimum Maximum

10   0   10

Measurement Function	Voltage V	Resistance Ohm	Temperature ° C		
	Current 2A	Current 50A	Current 1000A	Diode test -|>|-	Pressure bar
Measurement Connection	MFC 1	MFC 2	Current probe	Pressure Sensor	Temperature Sensor
Measurement Kind	=	∿	Effective value		
Measurement Range	automatic	▼ ± 500 mV ▲			

System voltage Rotation speed

2nd measurement

Stimulate

◀ | Multimeter | Counter | Oscilloscope setting | Stimulators | Preset measurements | ▶

The following programs are available through the multimeter function buttons along the bottom edge of the screen:

Multimeter	**Counter**	**Oscilloscope setting**	**Stimulators**	**Preset measurements**
For measurement of voltage, amperage, resistance, temperature, pressure, and diode testing.	For measurement of frequency, period and duty cycle.	Digital dual trace scope for measuring wave forms.	Uses the DISplus multimeter leads as a signal source for DC V AC voltage, pulsed signal generation, resistance, and a power switch.	Pre-arranged tests that are used to test the most commonly monitored vehicle signals.

Multimeter   All of the multimeter functions are displayed in the display area of the screen. Both numerical and bar-graph test results are shown.

Once a function is selected, only the available test leads for that function remain highlighted.
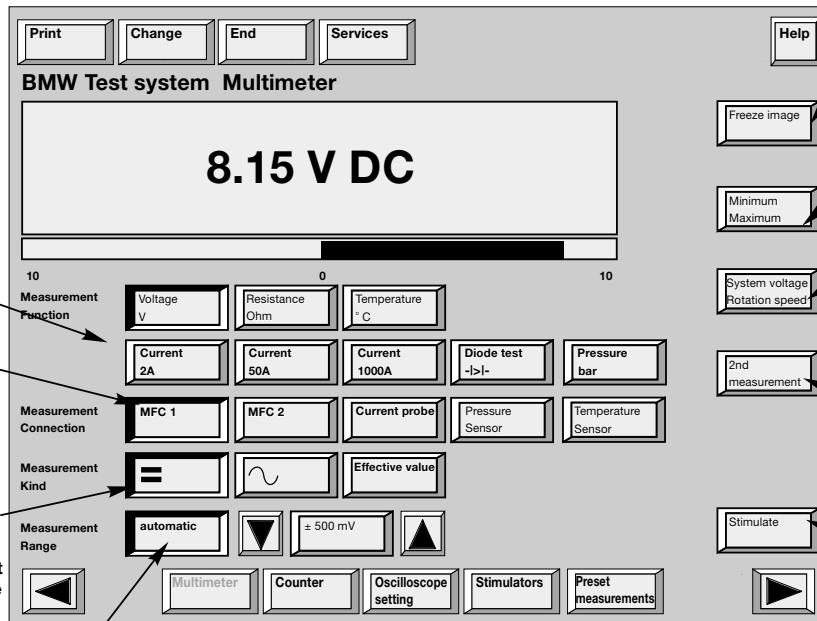
SELECT FUNCTION OF MULTIMETER:
1. VOLTS
2. OHMS
3. TEMPERATURE
4. CURRENT
   (2-1000A)
5. DIODE TEST
6. PRESSURE
   (bar)

FREEZES THE DISPLAY WHEN PRESSED

CAPTURES LOWEST & HIGHEST READINGS

ADDS THE BATTERY VOLTAGE AND ENGINE RPM TO THE DISPLAY

SELECT LEAD BEING USED (function dependant)

DISPLAYS TWO MEASUREMENTS SIMULTANEOUSLY

SELECT TYPE OF MEASUREMENT
DC - Direct Current
AC - Alternating Current
Or Effective Value - True RMS value

ACTIVATES STIMULATION DEVICE FOR VIEWING ON COUNTER THROUGH OTHER LEADS.

CHOOSE RANGE OF MEASUREMENT OR SET TO AUTOMATIC

[Screen illustration: BMW Test system Multimeter]

| Print | Change | End | Services | | Help |

BMW Test system Multimeter

8.15 V DC

10   0   10

Measurement Function: Voltage V | Resistance Ohm | Temperature °C
Current 2A | Current 50A | Current 1000A | Diode test -|>|- | Pressure bar

Measurement Connection: MFC 1 | MFC 2 | Current probe | Pressure Sensor | Temperature Sensor

Measurement Kind: = | ~ | Effective value

Measurement Range: automatic | ▼ | ± 500 mV | ▲

Multimeter | Counter | Oscilloscope setting | Stimulators | Preset measurements

Freeze image | Minimum Maximum | System voltage Rotation speed | 2nd measurement | Stimulate

Test Connections:

MFK 1   **Multifunction cable 1** (with two leads) is used to test all multimeter functions not requiring special sensors. MFK 1 is used to measure:

   • Voltage - up to 50 Volts
   • Current - up to 2 Amps
   • Resistance
   • Diode Testing
   • Frequency
   • Period
   • Duty Cycle
   • Pulse Duration

MFK 2   **Multifunction cable 2** (with four leads)
MFK 2 is used to measure:

   • Voltage - up to 500 Volts
   • Frequency
   • Period
   • Duty Cycle
   • Pulse Duration

Current probe   When selecting the 1000A current measurement function, the current probe will be the default test connection. The current probe is self calibrating.

Pressure sensor   When selecting the pressure measurement function, the pressure sensor will be the default test connection. The reading will begin at approximately 1 Bar (the reading cannot be zeroed).

Temperature sensor   When selecting the temperature measurement function, the temperature sensor will be the default test connection. The reading is only provided in degrees Celsius.

Type of measurement: Various measurements require defining the type of signal measured.

DC: Set to test a direct current signal.

AC: Set to test for an alternating current signal.

Effective value   Displays a measured AC wave form as the RMS (root-mean-square) value. The RMS value is the DC equivalent of the voltage or current produced by an AC wave form.

Measuring Range: Sets scale range for selected measurement.

automatic   Scale will automatically range to the best suitable range.

+/- 200mV   Arrows are provided for the user to manually set range of measurement.

Special Functions

Hold screen   Freezes the display with the current test results. Serves the same function as the buttons on the large MFK1 and 2 test leads.

Minimum/ Maximum   The current measured value is constantly monitored. The highest and lowest measured value since the activation of the function is displayed below the actual display.

Diagnosis and Information Systems

System voltage
Engine speed

System voltage and **engine speed** adds an additional field to the display that measures system voltage and engine RPM along with the original measurement. This feature requires that the diagnostic head be connected.

2nd measurement

2nd measurement splits the main display field into two separate displays. This permits two measurements from separate test leads to be displayed at the same time.

Note: only one of the special functions may be enabled and displayed at a time.

Stimulate

Stimulate allows the user to turn on or off the stimulate output function while in the multimeter. This is useful when applying an output signal to a vehicle circuit for testing purposes.

Counter

LENGTH OF TIME THE PULSE IS ACTIVE (ON SEGMENT) IN MILLISECONDS

LENGTH OF TIME FOR ONE COMPLETE CYCLE IN MILLISECONDS

NUMBER OF PULSES PER SECOND (Hz)

% OF TIME PULSE IS ACTIVE DURING FULL CYCLE OF WAVE

FREEZES THE DISPLAY WHEN PRESSED

CAPTURES LOWEST & HIGHEST READINGS

ADDS THE BATTERY VOLTAGE AND ENGINE RPM TO THE DISPLAY

ACTIVATES STIMULATION DEVICE FOR VIEWING ON COUNTER THROUGH OTHER LEADS.

FREQUENCY (Hz) = TOTAL NUMBER OF CYCLES IN 1 SECOND

PULSE DURATION

PULSE DUTY FACTOR = % OF ON TIME

PERIOD = MS TIME FOR ONE CYCLE

Print   Change   End   Services   Help

BMW Test system   Counter

Hold screen

50 Hz

Minimum Maximum

0   50   100

System voltage Rotation speed

SELECT WHAT LEAD

Test function   Frequency   Period duration   Pulse duration   Pulse duty factor

ADJUST THE MONITORING RANGE OF COUNTER

Test connection   MFC 1   MFC 2

Test range   automatic   ▼   0.1..1 Hz   ▲

ADJUST THE POINT ON THE WAVE AT WHICH THE COUNTER BEGINS TO "COUNT"

Trigger level   ▼   5.0 V   ▲

Trigger edge

Stimulate

◄   Multimeter   Counter   Oscilloscope setting   Stimulators   Preset measurments   ►

LEADING EDGE   FALLING EDGE

SELECT THE STARTING POINT ON THE WAVEFORM WHERE THE MEASUREMENT BEGINS

The counter function of the DISplus measurement system allows the user to measure time based signals. The measurements are:
• Frequency
• Period
• Pulse duration
• Pulse duty factor

The desired measurement is set-up from the screen by selecting from the following:
• Measurement function
• Test cable
• Measurement range
• Trigger level (default is set at 5 Volts)
• Trigger slope (determines which portion of the signal will be used as the trigger point)

Oscilloscope Function

The oscilloscope function of the DISplus uses a digital dual trace display screen. There are two methods for setting up the scope to display a pattern: manual setup or preset measurements.

The oscilloscope setting screen is used to manually select how the measured signal will be displayed.

TWO CHANNEL SET UP PANELS (A&B) FOR THE DUAL TRACE OSCILLOSCOPE

CHANNEL "A" IS DISPLAYED IN YELLOW ON THE SCOPE. THE LEADS AVAILABLE FOR DISPLAY ARE SELECTED HERE.

CHANNEL "B" IS DISPLAYED IN GREEN ON THE SCOPE. THE LEADS AVAILABLE FOR DISPLAY ARE SELECTED HERE.

CHANNEL "A" MEASUREMENT TYPE

CHANNEL "A" MEASUREMENT RANGE

SET FREQUENCY RANGE
THIS ADJUSTMENT SETS THE SCOPE DISPLAY TO VIEW A SAMPLE PIECE OF THE WAVE FORM.

• LOWER HZ VALUE = LONGER TIME DISPLAY (STRETCHED PICTURE OF WAVE FORM)

• HIGHER HZ VALUE = SHORTER TIME DISPLAY (CONDENSED PICTURE OF WAVEFORM)
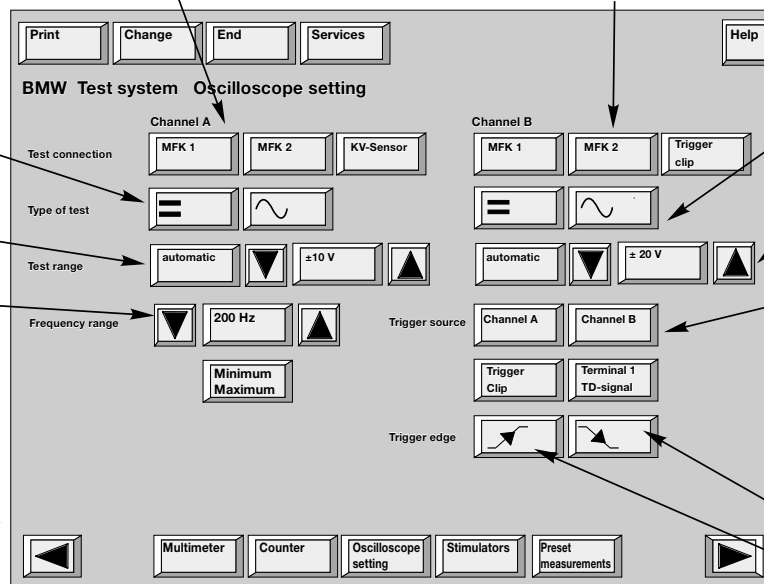
CHANNEL "B" MEASUREMENT TYPE

CHANNEL "B" MEASUREMENT RANGE

POINT AT WHICH THE SCOPE STARTS TO DISPLAY THE WAVEFORM

TRIGGER EDGE: SETS THE STARTING POINT ON THE WAVEFORM WHERE THE MEASUREMENT BEGINS

FALLING EDGE

LEADING EDGE

Print   Change   End   Services   Help

BMW Test system   Oscilloscope setting

Channel A
Test connection   MFK 1   MFK 2   KV-Sensor
Channel B   MFK 1   MFK 2   Trigger clip

Type of test   =   ∿   =   ∿

Test range   automatic   ▼   ±10 V   ▲   automatic   ▼   ± 20 V   ▲

Frequency range   ▼   200 Hz   ▲   Trigger source   Channel A   Channel B
Minimum Maximum   Trigger Clip   Terminal 1 TD-signal

Trigger edge   ◢   ◣

◄   Multimeter   Counter   Oscilloscope setting   Stimulators   Preset measurements   ►

Once the settings are complete and the test connections are made the oscilloscope graph may be viewed by selecting the "Oscilloscope display" button.

The oscilloscope signal pattern may be adjusted by manipulating the voltage level and the trigger level (voltage) from within the display screen. If the displayed pattern is still unreadable or incorrectly setup, the oscilloscope settings can be further adjusted by returning to the settings screen.

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Diagnosis and Information Systems

Oscilloscope display screen features

Once the signal pattern is displayed, the pattern may be locked on the screen with the "Hold screen" button or with the freeze image buttons on the test cable leads.

Holding the image will activate the "Cursor", "Zoom" and "Memory" features. Holding the image also allows the signal pattern to be visible when printing the screen.

Cursor 1 and 2

This feature is used to measure the amplitude and time differential of the signal pattern. Activate the feature by pressing the Cursor 1 button first. A vertical line will appear. Roughly position the line by touching the desired measurement point on the screen.

Anywhere the cursor line intersects the signal pattern, the amplitude value at that point will be displayed in a box on the right of the display screen. If both traces of the scope are being used, (both channel A and B) each value will be shown in its own box. A fine adjustment may be made to the cursor line by using the arrow buttons to the left and right of the cursor buttons.

The time differential between two points may be measured if cursor 2 is used. Place the second cursor at the desired measurement point. The time difference between the two cursors will be displayed in the "Time value" box on the right side of the screen.

WITH FREEZE IMAGE SELECTED, PRESS "MEMORY". USE THE ARROW BUTTONS ON THE TOP TO SCROLL BACK THROUGH 9 PULSES OF THE WAVEFORM.

ADJUST WITHIN VOLTAGE LEVEL OF MONITORED SIGNAL TO KEEP WAVE FROM "WALKING" ON SCREEN.

"FREEZES" WAVEFORM ON SCREEN FOR MEASUREMENT DISPLAY IN CONJUNCTION WITH CURSOR BUTTONS OR ZOOM FUNCTION.

WITH FREEZE IMAGE SELCTED, USE CURSOR BUTTONS TO MARK MEASURING POINTS ON THE WAVE FORM. USE YOUR FINGER ON THE SCREEN TO SET APPROX POSITION, THEN USE ARROWS TO LOCATE EXACTLY.

DISPLAYS SECOND CHANNEL (ie: MFK 2)

AFTER PRESSING FREEZE IMAGE BUTTON PRESS ZOOM TO SHOW DETAIL IN TIME SCALE OF WAVE (AMPLITUDE OF IMAGE DOES NOT "ZOOM")

TIME SCALE OF WAVEFORM. THIS SCALE CHANGES BASED ON FREQUENCY ENTERED IN THE OSCILLOSCOPE SET UP SCREEN

AMPLITUDE VALUE DISPLAY WINDOWS.

DISPLAYS TIME VALUE OF MARKED PORTION OF WAVE. ALSO CHANGES TO MEMORY COUNTER.

ADJUSTS VERTICAL POSITION OF WAVEFORM ON SCREEN BY ADJUSTING BASELINE POSITION.

PRESS TO ACTIVATE STIMULATION DEVICE FOR VIEWING ON SCOPE.

Zoom

By selecting the "Zoom" button, a section of the signal pattern may be enlarged to show greater detail. The desired section of the display is called up by touching the screen at the desired spot.
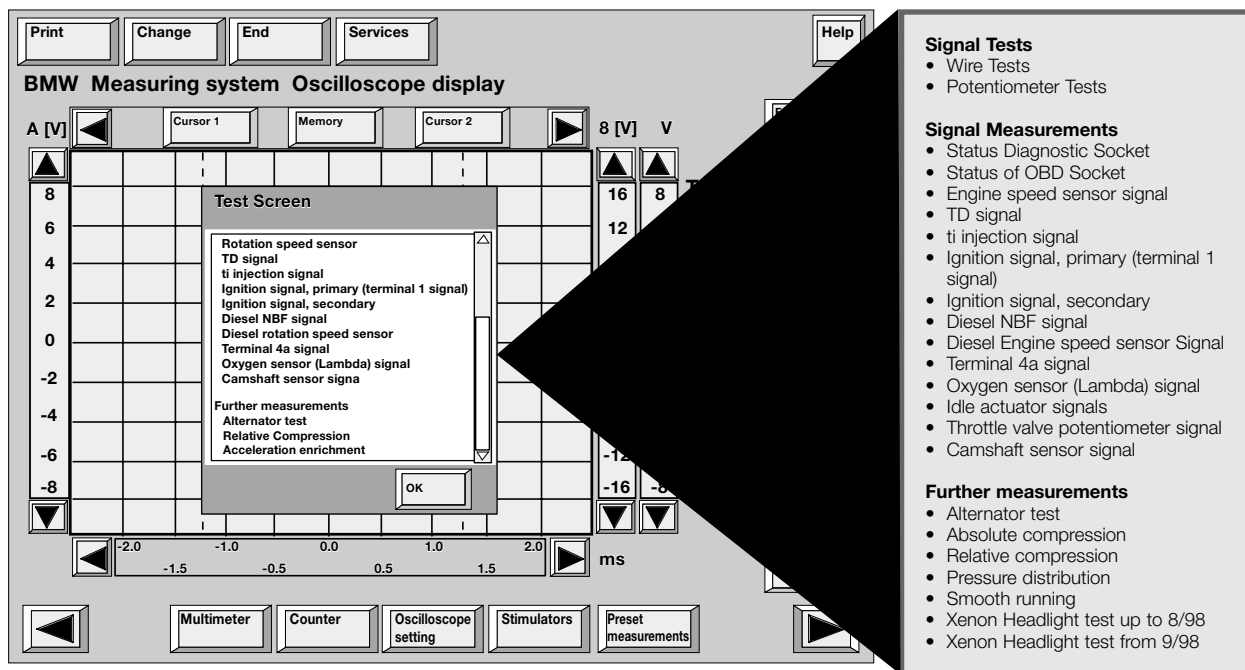
Memory

Memory pages are stored every time the Hold Screen is activated. The DISplus stores the last 10 trigger pulses at the time the screen is held. To recall the memory pages, press the "Memory" button and use the left arrow button to scroll through the previous 9 pages (page 10 is already displayed). The cursor and zoom features may be used on the stored pages.

Preset Measurements

The preset measurements provide an easy method of testing several commonly measured signals. To enter the presets: Press the "Preset measurements" button on the bottom of the screen. A pop up window will provide several signals to choose from. Selecting the signal and pressing the OK button will automatically configure the oscilloscope to the settings needed to provide the best trace pattern. Many tests also have specialized boxes with additional readings(i.e RPM, system voltage).

For instructions on which cables to use for the preset test, follow the instructions in the "Preset measurements" selection of the "Help" menu.

Since the oscilloscope settings are pre-determined, no changes to the oscilloscope are possible.

Output Stimulator

The stimulation function of the multimeter can be used to provide an output signal from the DISplus to test various components or vehicle wiring. MFK 1 and the small leads of MFK 2 are used to conduct the output signal.   After selecting the cable, press the Stimulate button in the right lower corner to activate.

The following signal types may be simulated with this function:
- DC Voltage from 0 to 15 Volts
- AC Voltage from 1Hz to 1KHz and 0 to 15 Volts
- Digital frequency from 1Hz to 5KHZ and 0 to 100% duty cycle
- Resistance from 0 to 10Kohm (MFK 1 only)
- DC voltage using on/off switch

1. DETERMINE WHAT TYPE OF OUTPUT SIGNAL IS REQUIRED

2. ADJUST THE "AMOUNT" OF THE OUTPUT STIMULATION SIGNAL

3. CHOOSE WHERE THE OUTPUT SIGNAL WILL BE ACCESSED (MFK ?)

| Print | Change | End | Services | | Help |

BMW   Test system Stimulation devices

MFK

DC Voltage source 5.25 0 V 15 V | 1 | 2 |

Frequency 370 1 Hz Frequency 1000 Hz 5.25 0 V Amplitude 15 V | 1 | 2 |

THIS FUNCTION PROVIDES Approx. 12 VOLT OUTPUT TO SIMULATE A BATTERY SUPPLY

PROVIDES AN ADJUSTABLE RESISTANCE VALUE IN SERIES WITH MFK 1 *Only!*

Frequency 2.5 1 Hz Frequency 5000 Hz 33.5 0 % Pulse duty factor 100 % | 1 | 2 |

Resistance Stimulation device 3.54 0.01 KOhm 10 KOhm | 1 |

WITH CIRCUIT BREAKER CABLE CONNECTED TO REAR OF DIS, POWER SWITCH OPERATES THE POWER FLOW. SWITCH GRAPHICALLY DEPICTS ON/OFF STATUS

Power Switch ON OFF **Battery voltage** | 1 | 2 |

Stimulate

4. STIMULATE BUTTON MUST BE PRESSED TO ACTIVATE FUNCTION

| Multimeter | Counter | Oscilloscope setting | Stimulators | Preset measurements |

Workshop Hints

Administration

The Administration page is used to access various installation, test and house keeping functions for the TIS, DIS system programs. The Administration menu offers the following options:

Print	Change	End	Services		Help

BMW Administration

TIS	DIS	Admin.
Update	Update	Update
Installation	Installation	Paper format
Data update	Feedback statistics	Network Configuration
Password	Date Time	Connection setup
KDS	Self-test	
Diskcopy	Calibrating touchshield	
Country code	Language	

CD drive allocation

CD drive 1	TIS V3.00.09/2000 - (1/1): 01 57 9 788 177607 US Programs	Activate CD
		Deactivate CD
		Change CD

◀   ▶

TIS Administration Functions

Update

Update is used to add additional information to the existing TIS program loaded in the hard drive.

Installation

Installation is used to initially load the TIS program. To load: The TIS CD must be inserted in the DVD drive and activated by pressing the "Activate CD" button. Once the CD is mounted and the installation button is pressed, loading takes place automatically.

Data update, Password, KDS,Disc copy and Country code are currently not used for the U.S. market.

Diagnosis and Information Systems

DIS Administration Functions

Update

Update is used to add additional information in the form of an update floppy or CD ROM to the existing DIS program loaded in the hard drive.

Installation

Installation is used to initially load the diagnosis programs. To load: The Basis Program must already have been installed. The Programs CD is inserted into the DVD drive and activated by pressing the "activate CD" button.

Once the CD is mounted and the installation button is pressed, loading takes place automatically. Always follow the loading instructions provided in the S.I.B. that accompanies the new DIS software.

Feedback Statistics

Feedback statistics provides a record of all of the reports entered using the "Feedback" feature under the "Services" menu. The report may be downloaded onto a floppy at the end of the reporting period.

Date Time

The **Date and Time** may be corrected using the on screen arrows. Once the values are set, an internal battery maintains the running clock and date when the DISplus is powered off.

Self-test

The **Self test** function is used to test the integrity of the internal components, the drives, the measurement system and the external measuring cables. Once selected, the self test function offers the following possible tests to be performed.

- **Technical System** - Individual tests may be carried out on various hardware components of the DISplus computer.

- **Measuring System** - This test checks the integrity of the measurement system and all of the external cable connections. The test may be carried out on the complete system or individual cables.

Calibrating Touchshield | **Calibrating Touchshield** is used to calibrate the position of the cursor. Follow the on screen instructions for touching the target areas. The DISplus will acknowledge the calibration if completed properly.

Language selection is not used for the U.S. market.

General Administration Functions

Update | The **Update** button in the Admin. column, allows loading a CD ROM or floppy to update the Basis System.

Paper format | **Paper format** is used to configure the printer output for DIN paper (21x30cm) or U.S. letter (8.5x11inch)

Network Configuration |

The **Network configuration** screen is used to assign and change the I/P addresses of the DISPlus, Diagnostic Heads and Network printer.

In order to make all of the components above communicate with each other when connected to the workshop network, each device must have a defined I/P address, otherwise no communication can take place.

The individual I/P addresses are assigned by the Network Installer (ADP or Reynolds & Reynolds). Only the Network Coordinator for your site should enter or change the addresses for any devices on the Network.

Connection Setup

The **Connection Setup** screen is used to:

- Establish Radio/hardwire communication with the Diagnostic Head.

- Terminate Radio/hardwire communication with the Diagnostic Head.

- Test the communication with the Diagnostic Head.

- Assign a colored band to the Diagnostic Head for identification.