Computermobile

Mark II

TRW's MOBILE COMPUTER CENTER

304/1085

Computermobile Mark II

TRW's MOBILE COMPUTER CENTER

SUMMARY

The TRW Computermobile is a semi-van instrumentation trailer outfitted as a self-contained mobile computer control room. The Computermobile is an environment specially designed for a TRW-330 or TRW-340 Control Computer System, complete with universal input-output. This combination provides the utmost flexibility for any industrial computer application.

The TRW Computermobile can be purchased outright, or a standard unit can be leased on a short-term basis.

The TRW mobile computer center, equipped with a TRW-330 or a TRW-340 computer system, is a powerful industrial research, test, and development unit. It can contribute in the following ways to industrial computer applications:

(1) Since the TRW computer system in the center is completely mobile, it can be installed at a plant site at minimum expense, and conveniently relocated at other facilities.

(2) With the TRW-330 or TRW-340 computer, the mobile computer center provides a complete on-line data collection, reduction, and computation facility for evaluation of unit design and operation.

(3) The output capability of the TRW computer systems facilitates the scheduling and control of tests and the development of improved control systems.

(4) The TRW Computermobile can be applied to actual on-line industrial control whenever the need arises.

The Computermobile is a powerful and flexible study tool. It can provide significant returns through increased process operating and design knowledge and more efficient utilization of professional manpower.

A typical arrangement of the Computermobile is shown on the following pages.

COMPUTER SYSTEM

The TRW mobile computer center uses a computer system based on either the TRW-330 or the TRW-340 Digital Control Computer.

The TRW-330 computer has a magnetic drum memory that can be supplied in sizes from 8,000 to 131,000 words. The TRW-340 is a combination core-drum computer; the core memory can contain between 4,000 and 65,000 words, and the drum has the same capacity as the TRW-330 drum. Both computers employ a word length of 28 bits. With either computer system, over 2000 instrument signals can be automatically received.

Virtually any configuration of input-output equipment can be incorporated into the Computermobile. Thus the center can be used for simple data logging, for analysis and computation, for test purposes, or for simulated or actual on-line industrial control.

Common display and recording equipment available includes Flexowriter, paper tape punch and reader, logging typewriter, digital time-of-day clock, visual displays, analog indicators, and strip chart recorders. A wide variety of special-purpose peripheral equipment can also be added: magnetic tape units, large display panel, X-Y plotters, high-speed printers and punches.

The TRW-330 and TRW-340 computer systems are fully described in other booklets published by TRW Computer Division. TRW's process control software system -- PROCOMP -- is also described in other TRW booklets.

INSTRUMENTATION TRAILER

The TRW Computermobile is based on a 40-foot instrumentation trailer that provides ample room for equipment and a comfortable environment for personnel.

The instrumentation trailer is a straight-frame type with steel chassis. The trailer, utility equipment, and accessories conform to all state laws and regulations concerning size and weight.
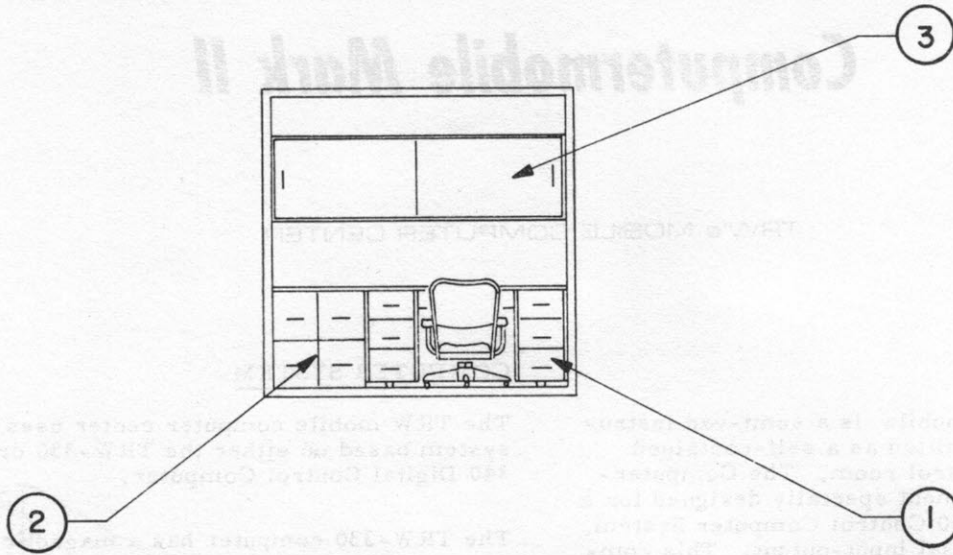
FORWARD VIEW AA
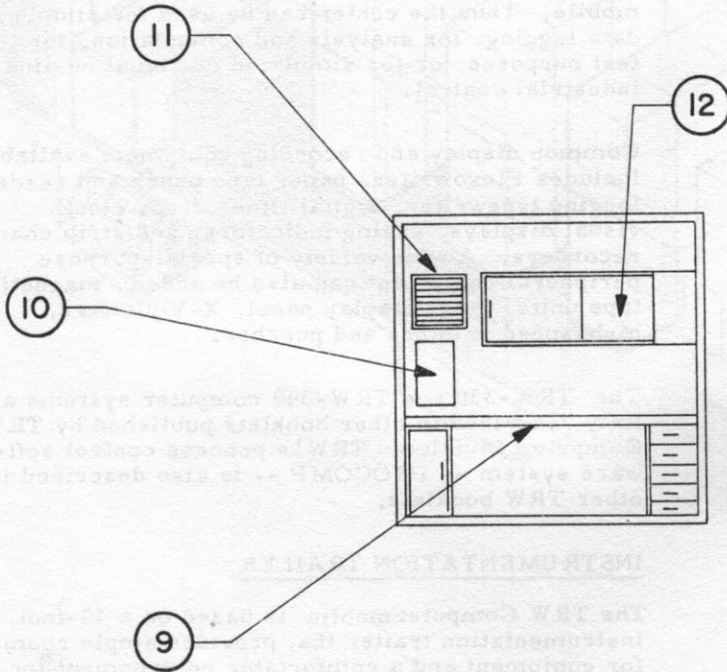
REAR VIEW BB

1 Standard Office Desk
2 File Cabinets
3 Slide Door Cabinets
4 Logger Shelf
5 Standard Office Conference Table
6 2-Shelf Hat-and-Coat Rack
7 Window
8 Side Cargo Door
9 Work Table
10 Circuit Breaker and Switch Panel
11 Return Air Louver
12 Slide Door Cabinets
13 Air-Conditioner Compartment
14 Cargo Doors
15 CO_2 Fire Extinguisher
16 Personnel Door
17 MSA Gas Alarm
18 Air Plenum Ceiling
19 Storage Compartment
20 Steps
21 Customer Cabinets
22 Computer Cabinets
23 Maintenance Panel
24 TRW-330 or TRW-340 Computer
25 Contact Input/Output Cabinets
26 Analog Input Cabinet

PORT ELEVATION
VIEW CC

PLAN VIEW

STARBOARD ELEVATION
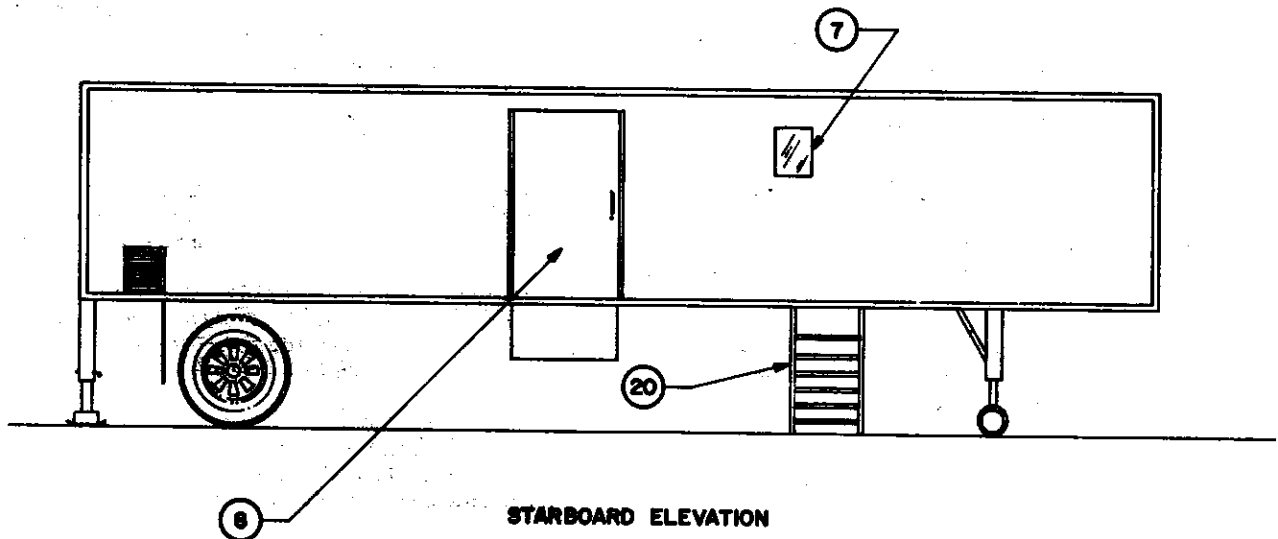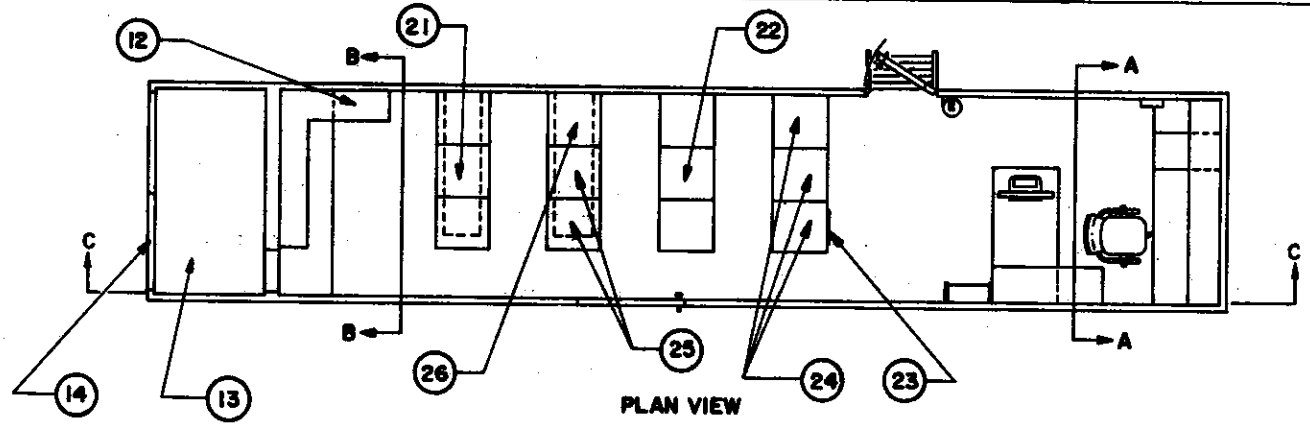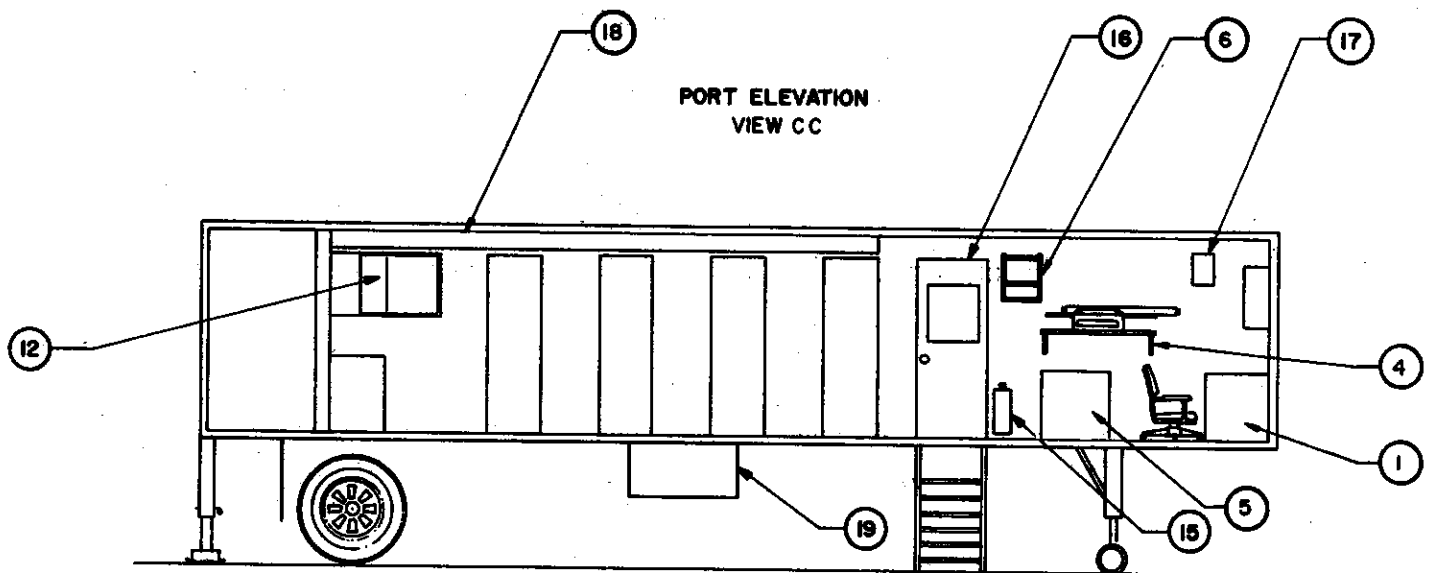
TYPICAL ARRANGEMENT

Computermobile Mark II

304/1084

BODY

Type -- Straight frame, single axle, steel or aluminum semi-van. Overall dimensions: 40' long, 8' wide, and 12-1/2' or 13-1/2' high. The trailer satisfies the transport restrictions and legal requirements of every state in the United States of America.

Air Conditioning and Machinery Section -- A 2" x 4" stud partition wall, approximately 48" from the rear wall, separates the rear air-conditioning compartment from the computer section. This wall has a suitable return air grill opening for the air conditioning system.

Computer Compartment -- The forward computer compartment is built and sealed to withstand a positive internal air pressure. The walls, ceiling, and ends of the computer compartment are insulated with 2" of insulation. The lining on all doors, walls, and ceiling is 1/4" waterproof plywood.

The floor is of 1" waterproof plywood, covered with vinyl asbestos 9" x 9" floor tiles.

DOORS AND WINDOWS

Personnel Door -- A single swing door, for rapid access, is located on the port side of the trailer. This door is approximately 30" x 80", is weather-stripped, locks from inside and outside with inside and outside door handles, has high clear opening, and opens outwards.

The door contains a 24" x 24" fixed safety glass window with movable wood shutters.

Cargo Door -- A single swing cargo door, approximately 44" x 80", is located on the starboard side of the trailer. This door is weatherstripped, locks from inside and outside with inside and outside door handles, has high clear opening, and opens outwards.

Rear Double Doors -- Rear loading doors provide access to the air-conditioning compartment. Doors are 3/4 double swing, clear opening, and open outward. These doors have outside handles only, and lock from the outside only.

Side Window -- An 18" x 24" fixed safety glass window with moveable shutter is located on the starboard side of the trailer, opposite the personnel door.

OTHER TRANSPORTATION AND CONSTRUCTION FEATURES

Personnel Step and Handrail -- One set of aluminum steps, with guard rail, is provided for ingress and egress from any of the doors provided. The steps can be stowed in a special jig under the trailer.

Leveling Jacks -- Two jacks are provided at the rear corners of the trailer for leveling, and to prevent swaying in high winds.

Drop Legs -- Two two-speed manual drop legs (landing gear), independently operated.

Mud Flap -- Rubber. One pair on each wheel set.

Tires -- Four, 9.00 x 20, 12-ply.

Storage Compartment -- A storage compartment is slung underneath the trailer, with a door on both port and starboard sides. Doors are locked by hasp and padlock. Approximate dimensions are 8" x 4" x 2".

Cable Hatches -- Two openings are provided in the floor of the van, beneath the input/output cabinets, so that all electrical and pneumatic signal lines can be brought directly to the cabinets. These openings have drawstring boots to squeeze the wires and seal the inside compartment against dust, moisture, and cold air, while at plant location. Weather-tight plates seal the openings when the trailer is on the road during transit.

Ventilation Louvers -- In the air-conditioning compartment, ventilating louvers allow a flow of air sufficient for the air-conditioning system.

Instrument Air Line -- A 1" air pressure line near the rear of the trailer can be used to supply air pressure to customer cabinets and to a service line over the work bench. An external air connection is furnished beneath the trailer.

INTERIOR FURNISHINGS

The following items are included in the computer compartment.

Desk and Chair -- A 5'-long 2-1/2' wide, 30"-high office-type desk is attached to the floor, to the right center of and parallel to the front end of the trailer. Both pedestals have conventional desk drawers, and a miscellaneous drawer is located in the center of the desk. A swivel chair to match the desk is included.

Conference Table -- A conference table is located directly opposite the office desk. The table top provides space for the System Flexowriter.

Logging Typewriter Shelf -- A shelf on the starboard side wall, just over the conference table, mounts the system logging typewriter. Approximate shelf dimensions are 5' x 1' x 2".

Coat Rack -- A 2-shelf hat rack with coat hooks is set on the starboard side wall. This rack, approximately 28" x 20" x 10", provides space for hats and coats of six people.

Book and Storage Case -- A 7-1/2' x 2' x 1' book and storage case is mounted over the office desk. The case has two sliding doors.

Work Bench and Stools -- A 36" high x 2' wide x 7-1/2' long work bench is located along the air-conditioning compartment bulkhead. This bench is attached to and is integral with the wall and floor.

The bench consists of a heavy-duty top covered with 1" tempered composition board and mounted on a steel cabinet pedestal on one end and a steel drawer pedestal on the other. Two shop-type stools are provided.

Work Bench Storage Case -- An L-shaped storage case approximately 7-1/2' x 2' x 1', is located on the trailer wall over the work bench. This case has 4 sliding doors.

File Cabinets -- Two 2-door letter-size file cabinets are located beside the standard office desk at the front of the trailer.

AIR-CONDITIONING AND HEATING SYSTEM

The combined cooling and heating system is capable of maintaining a controlled environment within the computer compartment. The inside temperature can be controlled to 75°F, 50% RH +5% regardless of the outside conditions. A slight positive pressure is maintained inside the computer compartment.

Air Conditioner -- A commercial single 5-ton unit (12,000 btu/hr/ton) is provided. The air-conditioning system is designed for heat dissipation of approximately 7 KW from equipment and lights, six persons working in the trailer, and external temperature limits of 0°F to 110°F at maximum humidity of 100%.

Heating System -- The heating system is an integral part of the combined cooling and heating system. The resistance-type strip heater element is rated at 10 KW. The heater is designed to maintain environment conditions as stated above.

Air Handling System -- The air system will deliver cooled or heated air to the workshop and office areas of the van. Only cool air is delivered to the plenum ceiling for the computer equipment cabinets when the trailer compartment demands heating due to winter conditions. The air system maintains a positive pressure inside the cabinets at all times.

The air handling system has a fresh air intake of not less than 5%. All fresh air and part of the return air is passed through suitable dust and charcoal filters. The filters can be removed and replaced readily.

Controls -- A thermostat sensor controls the demand for heat or cooling, as required by internal conditions, without manual transfer from one mode to the other.

LIGHTING

Main Lights -- Seven 4-tube fluorescent light fixtures, each 6 feet long, are mounted lengthwise along the trailer. The light is of adequate brightness (about 160 foot-candles/sq. ft.) and sufficiently shadowless that detailed work may be performed confortably in any open part of the computer compartment.

A switch at the side of the personnel door controls the lights.

Lighting is also available in the air-conditioning section, with a separate switch.

Running and Parking Lights -- These lights are standard ICC 12-volt lights, suitable for legal travel anywhere in the United States of America.

ELECTRICAL REQUIREMENTS

All electric power requirements inside the trailer will meet the National Electric Code. Main power to the trailer will be a 230-volt, a-c, 200-amp RMS, single-phase, 60-cycle, four-wire system (fourth wire for system ground). The power enters the trailer through a suitable weatherproof connector.

Air Conditioner Circuit -- 60 amp capacity at 230 volts ac. Circuit breaker.

Strip Heater Circuit -- 10.0 KW, 50 amp capacity at 230 volts ac. Circuit breaker.

Spare Circuit -- 30 amp capacity at 230 volts ac. Circuit breaker.

Lighting Circuit -- 15 amp capacity at 115 volts ac. Circuit breaker.

Work bench and Utility Circuit -- 20 amp capacity at 115 volts ac. Circuit breaker. Multiple receptacles.

Customer Utility Circuit -- 20 amp capacity at 115 volts ac. Circuit breaker. Multiple receptacles.

Utility Service Circuit -- 20 amp capacity at 115 volts ac. Circuit breaker. This circuit is restricted for use by system typewriters, and high-speed paper tape readers and punches.

Computer Circuit -- 30 amp capacity at 115 volts ac. Circuit breaker.

Gas Alarm Circuit -- 10 amp capacity at 115 volts ac. Circuit breaker. This circuit will handle the optionally provided MSA Gas Alarm.

Switch Control Panel and Junction Box -- All circuit breakers for the above circuits, air-conditioning controls, terminations, fuses, and junctions appropriate to the electrical power facility are labeled and enclosed in a suitable box mounted on the bulkhead wall. This box has expansion capability of 25% above requirements described here.

Power Grounding -- The trailer structures, conduit, motors, air-conditioning, etc. are adequately grounded to the fourth wire of the 4-wire main power system.

INTERIOR FINISH

Floor, ceiling, door, wall and trim, and furnishings will be furnished and painted according to the customer's wishes on purchased units.

A specified customer insignia may be painted on the trailer sides if desired.

OPTIONS

CO_2 Fire Extinguisher -- 20 pound capacity extinguisher mounted on the wall near the personnel door.

Combustible Gas Alarm -- A Mine Safety Appliances combustible gas alarm, Model DT-78500, capable of detecting methane, natural gas, and other explosive gases and vapors. This device senses air in the computer compartment. (Manufacturers recommendations are followed.) The unit is mounted on the wall about 6' high at the front end of the computer compartment. An indoor alarm light flashes when preset gas concentrations of 20% of lower explosive limit are reached.

Division II Requirements -- The air-conditioning and heating system can be designed to be explosion-preventive, as distinct from explosion-proof, to satisfy Division II area requirements. The main power connector would then also have to be specified as explosion-proof.

DOCUMENTATION

The following documentation is provided:

(a) Complete trailer wiring diagram and schematic.

(b) Dimensional drawings.

(c) Appropriate specifications, instructions, diagrams, schematics, and dimensional drawings (if necessary) of special equipment included in the trailer. Such equipment includes the air-conditioning.

INTERIOR FINISH

Floor, ceiling, door, wall and trim, and furnishings will be furnished and painted according to the customer's wishes on purchased units.

A specified customer insignia may be painted on the trailer sides if desired.

OPTIONS

CO_2 Fire Extinguisher -- 20 pound capacity extinguisher mounted on the wall near the personnel door.

Combustible Gas Alarm -- A Mine Safety Appliances combustible gas alarm, Model DT-78500, capable of detecting methane, natural gas, and other explosive gases and vapors. This device senses air in the computer compartment. (Manufacturers recommendations are followed.) The unit is mounted on the wall about 6' high at the front end of the computer compartment. An indoor alarm light flashes when preset gas concentrations of 20% of lower explosive limit are reached.

Division II Requirements -- The air-conditioning and heating system can be designed to be explosion-preventive, as distinct from explosion-proof, to satisfy Division II area requirements. The main power connector would then also have to be specified as explosion-proof.

DOCUMENTATION

The following documentation is provided:

(a) Complete trailer wiring diagram and schematic.

(b) Dimensional drawings.

(c) Appropriate specifications, instructions, diagrams, schematics, and dimensional drawings (if necessary) of special equipment included in the trailer. Such equipment includes the air-conditioning.