MC1-10/20
10/20 Channel
Module Case

Validyne
ENGINEERING CORP.

INSTRUCTION MANUAL

MODEL MC1-10/20

10/20 CHANNEL MODULE CASE

Rev. Date: January 1986

8626 Wilbur Avenue, Northridge, CA 91324-4498 • (818) 886-2057 • Telex 65-1303

VE(C446-12/81

WARRANTY

VALIDYNE ENGINEERING CORPORATION warrants equipment of its own manufacture to be free from defects in material and workmanship under normal conditions of use and service.

VALIDYNE will repair or replace any component found to be defective on its return to VALIDYNE within the time specified below:

1. Pressure Transducers and Pressure Transmitters (including transducers supplied as part of Digital Manometer Systems) within three (3) years of its original purchase.
2. Electronic products (Transducer indicator, carrier demodulators, plug-in signal conditioners, module cases, etc.) within one (1) year of its original purchase.

Buyer is requested to secure authorization of VALIDYNE, and to describe defect prior to return of equipment under warranty. Shipment to VALIDYNE shall be at Buyer's expense, with return at VALIDYNE's expense. NON-VERIFIED problems or malfunctions whether warranty or not are subject to a $80.00 evaluation charge.

The warranty carries no liability, either expressed or implied, beyond our obligation to repair or replace, at VALIDYNE's option the unit which carries the warranty to the original purchaser. Prices, specifications and designs subject to change without notice. This warranty is void if the product is subjected to misuse, accident, neglect or improper application, installation or operation.

REPAIR POLICY

Units returned to VALIDYNE for repair which are not under warranty will be subject to the following conditions.

1. A description of the problem or malfunction shall accompany the unit returned for repair, or be communicated to VALIDYNE prior to shipment. Otherwise there will be a minimum evaluation and/or calibration charge of $80.00.
2. Unit will be repaired automatically if charge is less than 65% of current list price unless other specific instructions are received. Above 65%, VALIDYNE will request authorization by buyer.
3. If quotation is required before proceeding with repairs, unit should be accompanied by paper so stating, or information communicated to VALIDYNE prior to shipment.
4. Buyer is to secure authorization and shipping method from VALIDYNE prior to return of equipment or shipment will be rejected. (Applies to Canada only)

REPAIR WARRANTY

Warranty coverage on repairs is 90 days on work done, or to the end of the original warranty period, whichever is longest.

Validyne ENGINEERING CORP

8626 Wilbur Avenue
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TOLL FREE (800) 423-5851 (AK/CA use (818) number)
AUTOMATIC FAX (818) 886-6512

VESC120-8/88 REVISED

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REVISION PAGE

DATE	PAGE NO.	DESCRIPTION OF CHANGE	BY
01/81	i, ii, iii, iv, v, 4-1	Re-arranged Warranty page, Table of Contents, List of Illustrations; added Revision Page; corrected address, page 1-4	RHC
08/85	All	General revision to cover redesigned power supply, input/output connector changes and additions	WAT

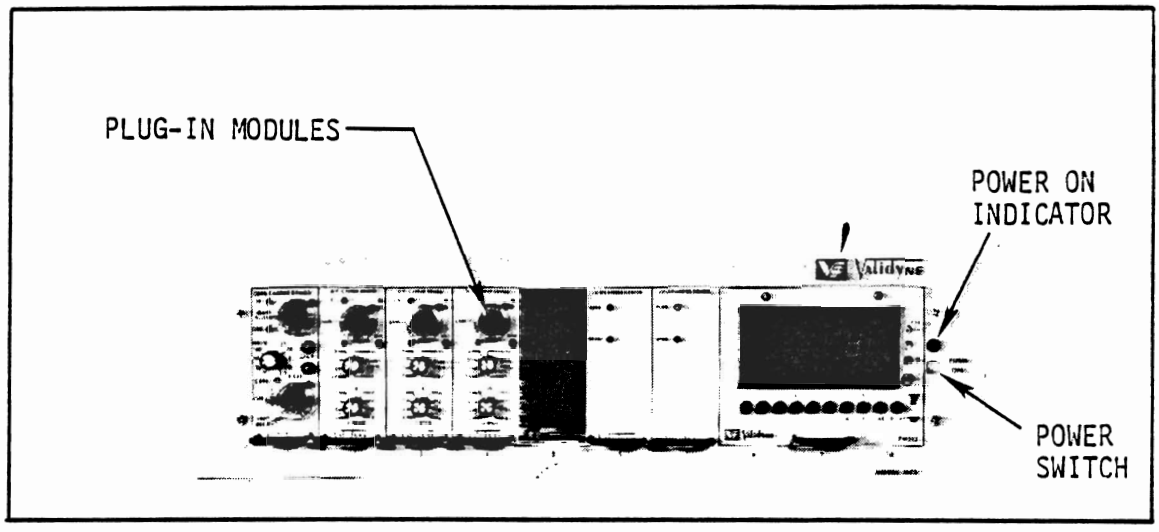


Figure 1-1. MC1-10 Module Case (shown with PM212 installed).

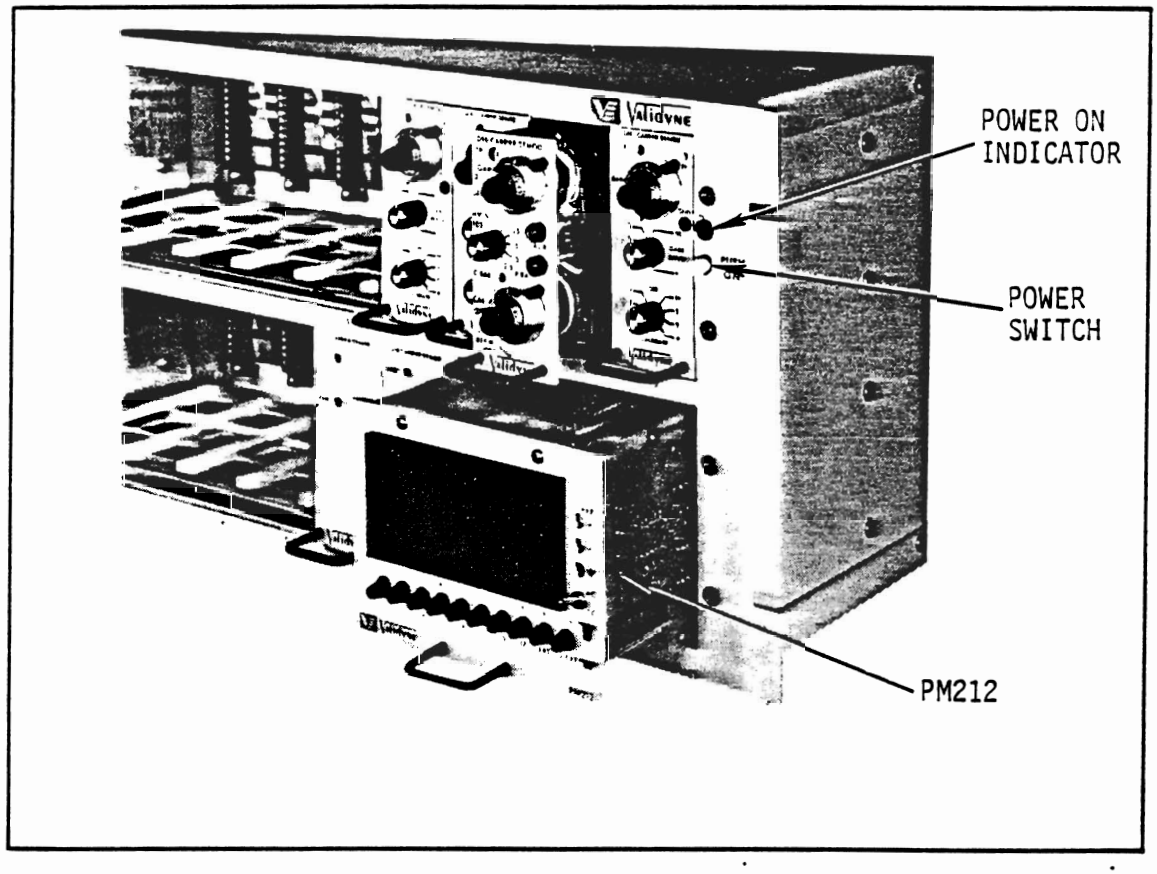


Figure 1-2. MC1-20 Module Case (shown with PM212 partially installed).

1-1 INTRODUCTION

1-2 This technical manual contains installation and operating instructions for the MC1-10 and MC1-20 Cases, manufacturered by Validyne Engineering Corporation, Northridge, California.

1-3 MODEL IDENTIFICATION

1-4 All MC1 module cases are identified by a part number which designates the various options specified by the customer. The following identification system is used:

MODEL MC1 - 10 - P - 1 - A - X

NO. OF CHANNELS
- 10 Ten
- 20 Twenty

INPUT/OUTPUT CONNECTORS
- P PT02/XLR (STD)
- T Terminal Strips
- W WK4/XLR

OPERATING VOLTAGE
- 1 110 Vac (STD)
- 2 220 Vac

CARRIER FREQUENCY
- A 3 KHz (STD)
- B 5 KHz
- C 10 KHz
- D 20 KHz

SPECIAL MODIFICATIONS
- 4-digit Number

1-5 PHYSICAL DESCRIPTION

1-6 The MC1-10/20 is an all metal constructed case, designed for installation in standard 19-inch relay racks, for use in data acquisition and control systems. The MC1-10 is designed to accept up to 10 modules while the MC1-20 is approximately double in height and will accept up to 20 modules. Plug-in modules are inserted through an opening in the panel of the module case. The only controls and indicators for the MC1-10/20 are a power switch (PUSH ON), and a power "on" indicator located on the front panel.

1-7 The rear of the case contains the power input socket, transducer input and output connectors, and a circuit breaker.

1-8 Deleted

1-9 FUNCTIONAL DESCRIPTION

1-10 The DC supply for all channels is ± 15 Vdc, with good regulation. The regulator is short circuit proof.

1-11 The carrier supply is a distortion-free Wien-bridge oscillator in a closely controlled feedback loop which guarantees constant output at the plug-in terminals. The standard frequency is 3 KHz, with 5, 10, and 20 KHz available on special order.

1-12 The oscillator can be synchronized to another MC1 Module Case by specifying (-530) option.

1-13 Deleted

1-14 TECHNICAL CHARACTERISTICS

1-15 The specifications for the MC1-10 and MC1-20 Module Cases are listed in Table 1-1.

TABLE 1-1
TECHNICAL SPECIFICATIONS

ITEM	CHARACTERISTICS
ELECTRICAL	
Power Input:	117/234 Vac, 50-400 Hz
Power Consumption:	150 VA Maximum
Protection:	2 Amp circuit breaker, rear panel mounted
DC_POWER_SUPPLY	
Voltage, Rated:	±15 Vdc, tracking
Line Regulation:	±0.05%, 105-130 Vac
Load Regulation:	±0.10%, 0-3 Adc
Temperature Regulation:	±0.01%/ °F, 0-160 °F
Power, Rated:	
MC1-10:	30 watts
MC1-20:	60 watts
Supply Protection:	Overload and short circuit proof with foldback limiting and auto-recovery

TABLE 1-1
TECHNICAL SPECIFICATIONS (continued)

ITEM	CHARACTERISTICS	
CARRIER POWER SUPPLY		
Voltage:	5 Vac, rms, sine wave	
Power:	10 VA maximum	
Frequency:	3 KHz unless otherwise specified; 5 KHz, 10 KHz, 20 KHz available.	
Regulation:	Amplitude	Frequency
Line, 105-130 Vac:	±0.05%	±0.01%
Load, 0-10 VA:	±0.15%	±0.10%
Temperature, 0-160 °F:	±0.01%/ °F	±0.006%/ °F
ELECTRICAL CONNECTIONS		
Transducer Input:	Bendix PT02A-10-6P, 1/channel, mating connector PT06-10-6S, or equal; Cannon WK4-32S available	
Output:	Cannon XLR-3-32S, 2/channel, mating connector XLR-3-11C or equal; 14-Pin IDC Header(s)	
Power:	3-wire socket, rear panel, (6 foot line cord furnished)	
MECHANICAL		
Size		
MC1-10:	5 1/4"H x 19"W x 12"D Standard rack mount (13.3 cm x 48.2 cm x 30.2 cm)	
MC1-20:	8 3/4"H x 19"W x 12"D Standard rack mount (22.2 cm x 48.2 cm x 30.2 cm)	
Weight		
MC1-10	20 lbs. Avdp (9.1 kg)	
MC1-20	22 lbs. Avdp (10.0 kg)	

2-1 MOUNTING PROCEDURE

2-2 The MC1-10/20 can be either rack mounted, or used as is on a bench. For rack mounting, all that is required for installation is to secure the Module Case to a standard 19-inch rack with four screws.

2-3 ELECTRICAL POWER CONNECTIONS

2-4 The power cord is packed separately. Connect the power cord to the rear of the Module Case and to the specified power source.

2-5 Press the front panel power switch. The adjacent red pilot light should light, indicating that the ±15 V supply is operating properly.

N O T E

THE DC AND CARRIER SUPPLIES WILL STABILIZE AND BE READY FOR OPERATION WITHIN SECONDS OF TURN-ON.

2-6 PLUG-IN MODULE INSTALLATION

2-7 Install the selected plug-in modules in the Module Case. Be sure that the modules are fully seated to insure good electrical connections. All modules may be installed or removed

with the power "on" without damage to the modules or power supplies, and without effect on adjacent channels. Instructions for operation of individual modules are contained in separate manuals which are shipped with the modules. A description of available plug-in modules can be found in Section V and in the MC1 Systems Brochure.

2-8 Deleted

2-9 Deleted

2-10 Deleted

2-11 INPUT/OUTPUT CONNECTIONS

2-12 All transducer input and electrical output connections are made at the rear of the Module Case. Figure 2-1 is the internal connector wiring diagram for the Module Case. The 14-pin terminal headers (one on the MCI-10, two on the MCI-20) allow convenient ribbon-cable connection of the "A" outputs to the model DA380 Intelligent Data Acquisition System.

2-13 OPERATING PROCEDURES

2-14 The only operating procedures required after installation of the plug-in modules, transducers, and monitoring equipment is to turn power "on". This is accomplished by pressing the button on the front of the Module Case and noting that the red light comes on. Individual instructions for each module are contained in separate manuals.

2-15 The Module Case is all solid-state, and no warmup is required for the case itself. Some warmup, however, may be required for specified performance of plug-ins. Consult the manual for each particular plug-in for this information.

2-16 Power dissipated in the module case is nominal, and does not require ventilation for specification performance. An electrostatic shield is incorporated to insure low noise operation in all installations.

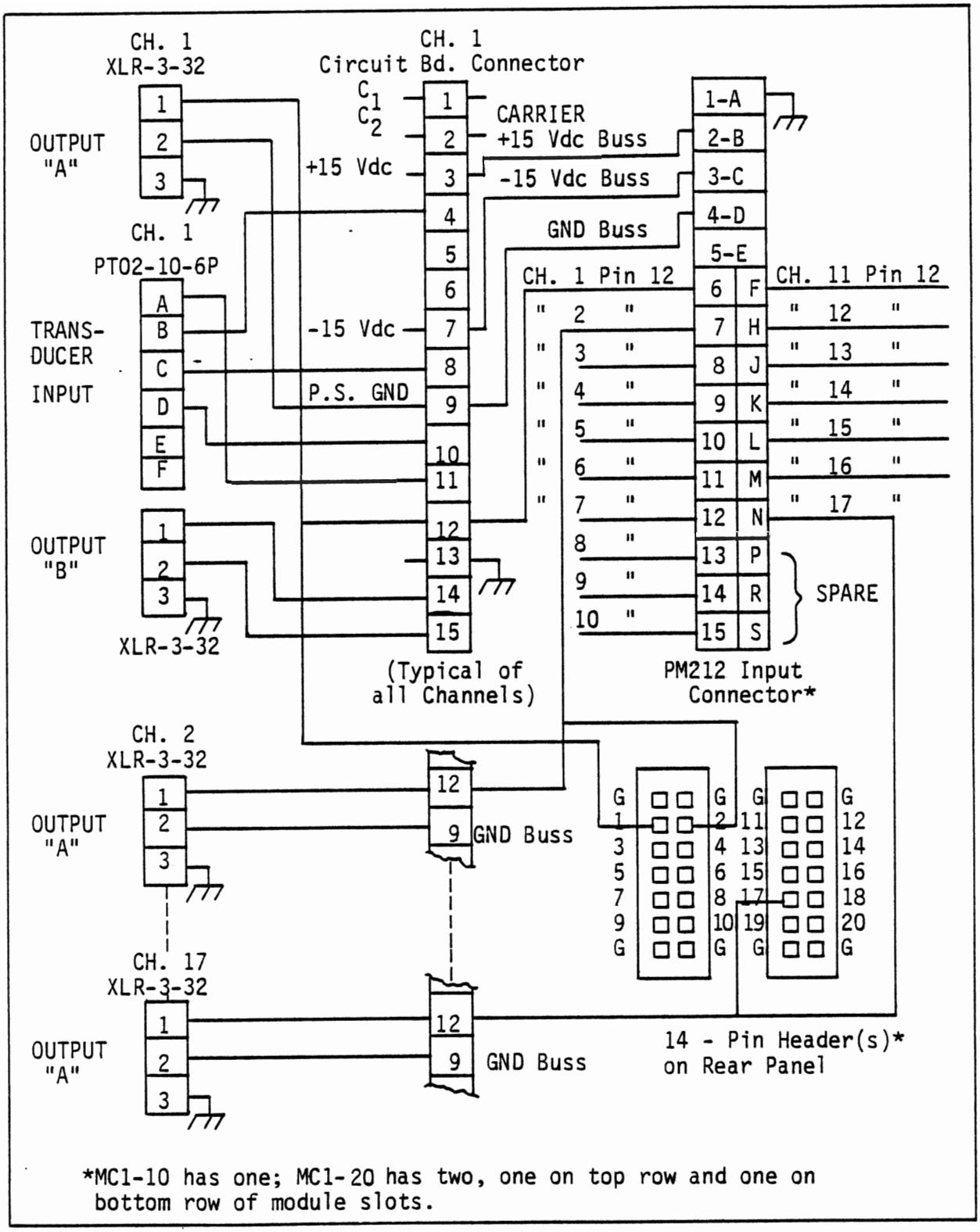


Figure 2-1

Internal Connector Wiring Diagram

3-1 DC POWER SUPPLY

3-2 The DC power supply is rated to deliver regulated ±15 Vdc to the carrier supply and the plug-in modules.

3-3 Deleted

3-4 Temperature rise on the heat-sink is nominal. If the system is subjected to heavy load and simultaneous high ambient temperature, a pair of transistors thermally connected to the heat-sink will shut down the supply until it cools. This occurs at a heat-sink temperature of approximately 100°C, and protects the components from damage.

3-5 The front panel light is an LED (Light Emitting Diode) connected to indicate the presence of the + and -15 V power supplies. An E.M.I. filter is built-in at the receptacle to prevent line noise from reaching the plug-in modules.

3-6 The schematic diagram of the MC1-10/20 DC Voltage and Carrier supply is shown in Drawing 11542. The rectifier/filter shematic is shown in Drawing 11538.

3-7 CARRIER SUPPLY

3-8 The carrier oscillator is a Wien-bridge type operating at 3 KHz. Carrier frequencies of 5 KHz, 10 KHz, or 20 KHz are available on special order.

3-9 The output amplifier is a complementary symmetry circuit capable of delivering 10 VA. The amplifier drives an output transformer with a precision center-tapped secondary. The AC output is fed back to a bridge rectifier. The bridge output is compared to a DC reference, and the integrated error signal is used to control output amplitude through an FET transistor. The oscillator and integrator use a dual monolithic wideband operational amplifier which ensures good amplitude control over the temperature range.

3-10 In the event of a power overload or short circuit, the oscillator will shut down, and recover automatically when the overload is removed.

Validyne Products, as a function of their basic design, do not require periodic re-calibration or maintenance, as such. If abnormalities in performance occur which cannot be corrected by adjustment procedures, the unit should be returned to the factory, transportation PRE-PAID, for evaluation and repair.

Turn-around time will be improved when, along with a brief statement about the malfunctions or performance degradation, information regarding purchase order data and number are enclosed with the instrument.

An estimate of repair costs, if requested, will be provided prior to commencement of work.

Warranty repairs will be handled as outlined in Validyne Engineering Corporation's Warranty Policy contained in the front of this manual.

Address all shipments and correspondence regarding returned units to:

Validyne Engineering Corporation
8626 Wilbur Avenue
Northridge, CA 91324

Attention: Customer Service Department

GENERAL PURPOSE PLUG-INS
(See MC1 System Brochure for a detailed listing of functional plug-ins)

NI157 Plug-in Null Indicator

Used as an AC Null Indicator to aid in adjustment of AC Signal Zero Balance when using the CD19 or CD90 High-Gain Carrier Demodulator.

LPF162 Plug-in Low Pass Filter

A unity-gain low pass filter for 0 to ±10V DC outputs of signal conditioning modules; switch-selectable time constants of 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200 & 500 seconds.

AD136 Plug-in Peak-Hold/Auto-Zero Module

In the Peak-Hold Mode, will track 0-10V DC input and hold peak until reset; in the Auto-Zero Mode, will automatically establish new zero reference for output upon command; reset is accomplished via front panel switch or remote contact closure.

ANALOG/DIGITAL READOUTS

PM118 Plug-in Analog Meter (for MC1-3, MC1-10, & MC1-20)

Vertical panel meter mounted on plug-in module; reads ±10V DC with center zero; connects to output of signal conditioning module via MC1 rear connectors (single channel readout).

PM204 Plug-in Analog Meter (for MC1-10 and MC1-20)

Vertical panel meter which plugs into Channel 10 (or -20) of the MC1-10 (or -20) for switch-selectable readout of nine (or 19) channels; reads ±10V DC with center zero; connects to outputs of signal-conditioning channels via internal MC1 wiring. Contains range switch for 10X scale expansion and mode switch to select either AC or DC meter operation. Also has external AC and DC inputs.

ANALOG/DIGITAL READOUTS (continued)

PM212-1 Plug-in Digital Meter (for MC1-10 and MC1-20)

3 1/2 digit (1999 max. count) digital readout which plugs into Channels 8, 9, 10 of MC1-10 or 8, 9, 10 or 18, 19, 20 of MC1-20 for switch-selectable readout of up to 17 channels; connects to channel outputs via internal MC1 wiring; accepts 10V AC RMS or DC external inputs via front panel jacks; user-programmable decimal point for each channel.

PM212-2 Plug-in Digital Panel Meter

Same as PM212-1 except 4 1/2 digits (19999 max. count).

MISCELLANEOUS ACCESSORIES

P/N 7273 Blank Panel

Used just to fill in the panel space of an empty channel.

P/N 7616-2 Plug-In Module Connection Extender

Allows plug-in modules to be checked for adjustments made outside of the MC1 module case. Consists of a PC plug-in board and a 20-inch cable with a PC board mating connector on the end.

P/N 8050-1 Blank Plug-In Module

A complete blank plug-in module with blank PC board. PC board contains no plating except for PC connector pads.

P/N 8050-2 Blank Plug-In Module

Same as -1, except copper-clad board for customer custom PC design.

P/N 8542-2 Module Interconnect Cable (Output to Output)

Standard 2-foot cable with XLR-3-11C Connector on both ends; used to connect output of one channel to output connector of any other channel (used with AL64, PM118, etc.).

P/N 8573-2 Module Interconnect Cable (Input to Output)

Standard 2-foot cable with PT06-10-63 Connector on one end and XLR-3-11C on other end; used to connect output of one module to input of another--e.g., CD18 to AD136.

P/N 2975-7501 AC Power Cord

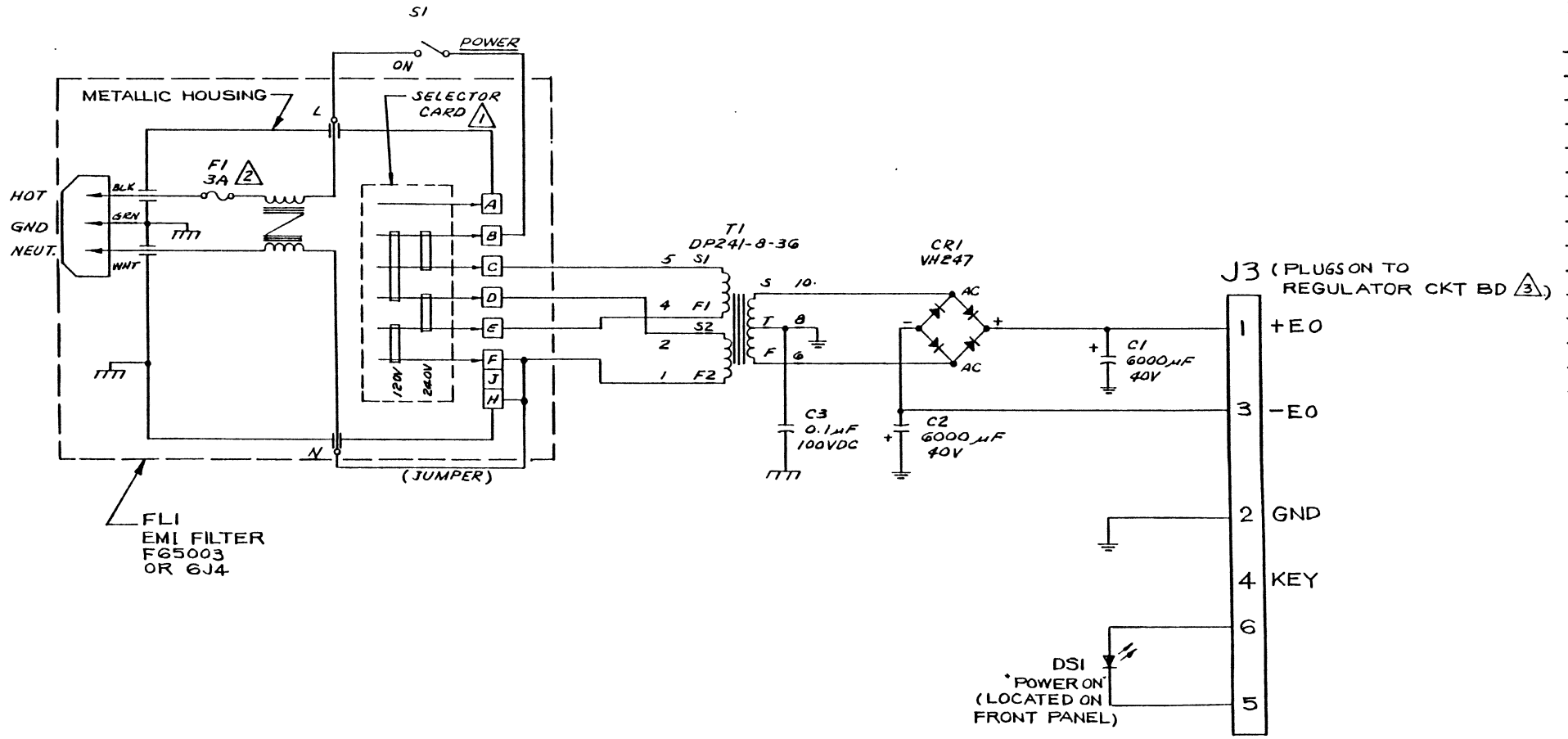
MISCELLANEOUS ACCESSORIES (continued)

MC1 Mating Connector Sets:

PN 11681 Set of 10 PT06-10-63 Input and 20 XLR-3-11C Output. For MC1-10. Order two sets for MC1-20

11538

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED



HIGHEST REF DES USED							
FL1	F1	C3	T1	CR1	DS1	S1	
REF DES NOT USED							

3. REGULATOR SCHEMATIC 11542.

2. FOR 230 VAC USE 1.5A FUSE.

1. USE ONLY 120 VAC OR 240 VAC POSITIONS OF EMI FILTER SELECTOR CARD AS APPLICABLE.

NOTES: UNLESS OTHERWISE SPECIFIED.

TOL. UNLESS NOTED
DEC. XXX
FRAC. & DEC. XX
ANGLES ± 1/2°
DIAMETERS WITH SAME ℄ SHALL BE CONCENTRIC WITHIN .005 TIR.
SURFACES MUST BE FLAT WITHIN .002 PER IN.
MAX FILLET .13 UNLESS NOTED.
DEBURR EDGES .025 MAX UNLESS NOTED.
SURFACE FINISH 63 UNLESS NOTED.
DRILLED HOLE TOL PER ANSI B97

CODE IDENT NO. 33107

SCALE

Validyne ENGINEERING CORPORATION NORTHRIDGE, CALIFORNIA 91324

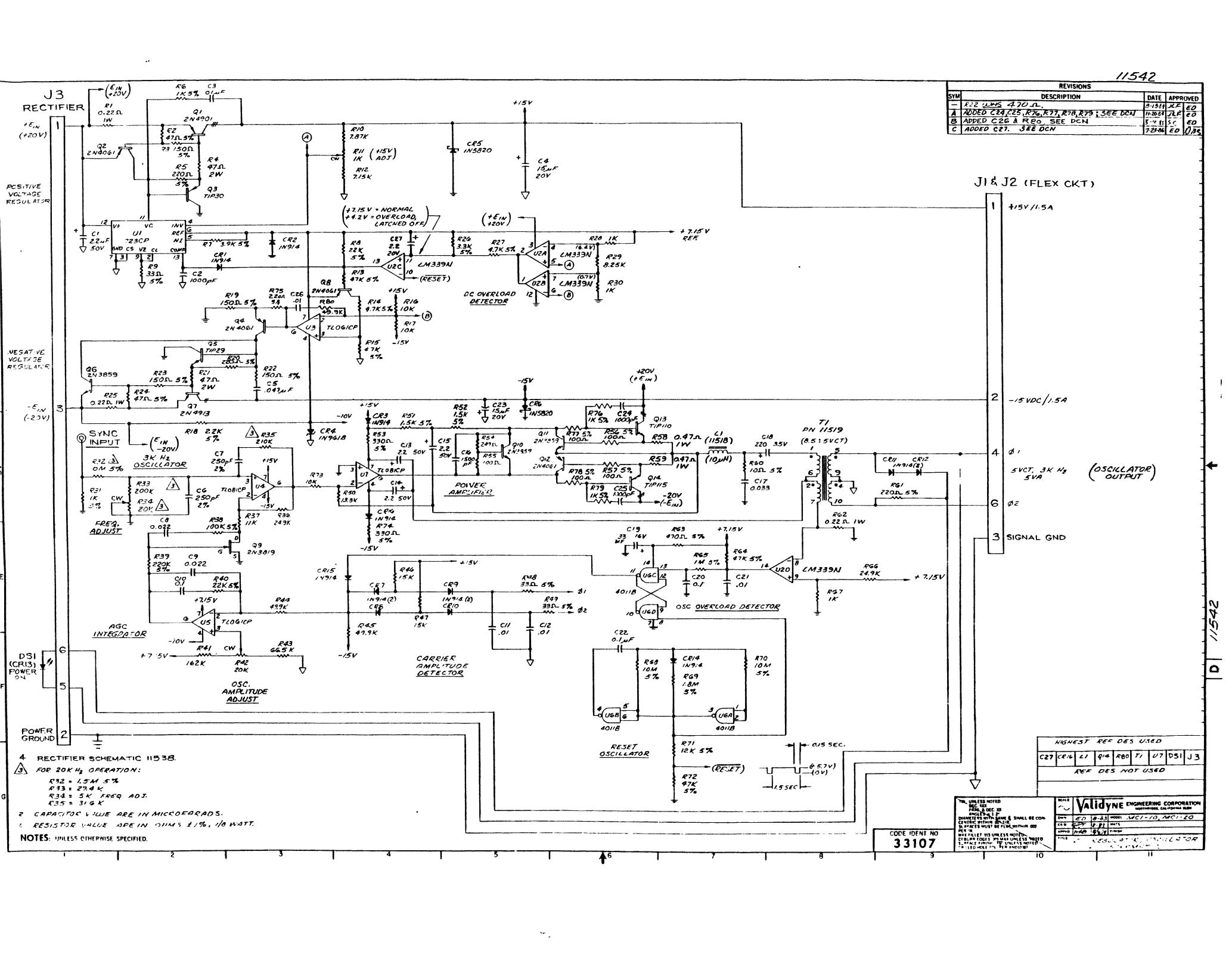
DWN	ED	8-83
CK'D	[illegible]	11-84
APPVD	RAS	11/84

MODEL MC1-10/-20

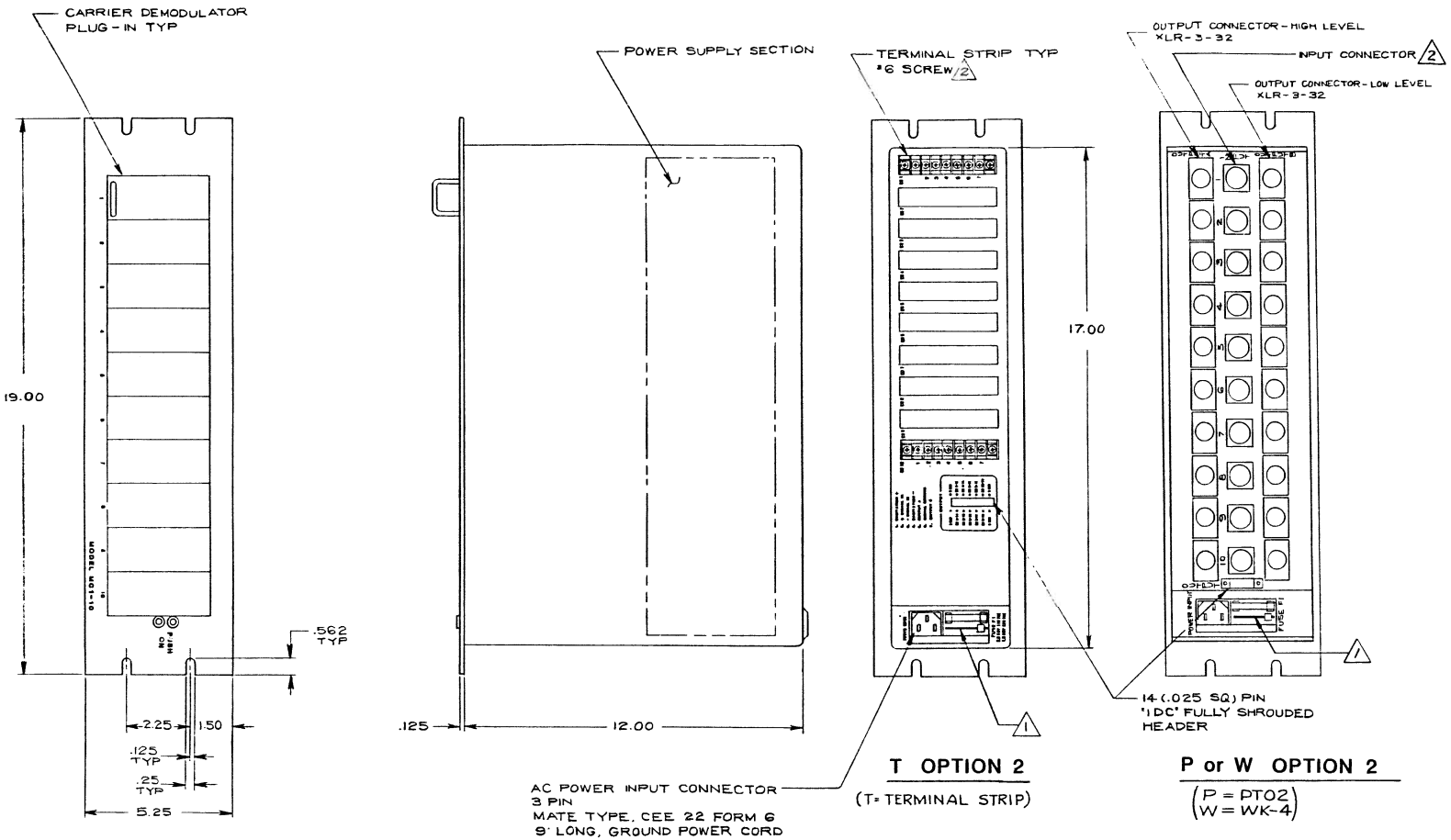
MATL

FINISH

TITLE SCHEMATIC. POWER SUPPLY RECTIFIER


11542
REVISIONS
SYM | DESCRIPTION | DATE | APPROVED
– | R22 WAS 470Ω. | 3-13-84 | JLE | ED
A | ADDED C24,C25,R76,R77,R78,R79 ; SEE DCN | 11-20-84 | JLE | ED
B | ADDED C26 & R80, SEE DCN | 5-14-85 | S.C | ED
C | ADDED C27. SEE DCN | 7-23-86 | ED | ED
J3 RECTIFIER
POSITIVE VOLTAGE REGULATOR
NEGATIVE VOLTAGE REGULATOR
SYNC INPUT
3K Hz OSCILLATOR
FREQ. ADJUST
AGC INTEGRATOR
OSC. AMPLITUDE ADJUST
DC OVERLOAD DETECTOR
POWER AMPLIFIER
CARRIER AMPLITUDE DETECTOR
OSC OVERLOAD DETECTOR
RESET OSCILLATOR
DSI (CR13) POWER ON
J1 & J2 (FLEX CKT)
+15V/1.5A
-15 VDC/1.5A
5VCT, 3K Hz 5VA (OSCILLATOR OUTPUT)
SIGNAL GND
T1 PN 11519 (8.5:5VCT)
L1 (11518) (10μH)
+7.15V REF
(+7.15V = NORMAL +4.2V = OVERLOAD, LATCHED OFF)
4 RECTIFIER SCHEMATIC 11538.
3 FOR 20K Hz OPERATION:
R32 = 1.5M 5%
R33 = 29.4K
R34 = 5K FREQ ADJ.
R35 = 31.6K
2 CAPACITOR VALUE ARE IN MICROFARADS.
1 RESISTOR VALUE ARE IN OHMS ±1%, 1/8 WATT.
NOTES: UNLESS OTHERWISE SPECIFIED.
HIGHEST REF DES USED
C27 | CR16 | L1 | Q14 | R80 | T1 | U7 | DS1 | J3
REF DES NOT USED
CODE IDENT NO 33107
Validyne ENGINEERING CORPORATION NORTHRIDGE, CALIFORNIA
MODEL MCI-10, MCI-20
11542
D

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
C	ADDED OPTIONS. SEE DCN	7-24-85	ED L.



MC1 MODULE CASES

MC1-10-P-1-A-X

1ST OPTION	NUMBER OF CHANNELS	
	03	3 (FUTURE)
	10	10
	20	20
2 2ND OPTION	CONNECTORS	
	P	PT02/XLR (STD)
	T	TERM STRIP
	W	WK4/XLR
3RD OPTION	INPUT VOLTAGE	
	1	110 VAC (STD)
	2	220 VAC
4TH OPTION	CARRIER FREQUENCY	
	A	3K HZ (STD)
	B	5K HZ
	C	10K HZ
	D	20K HZ
5TH OPTION	CHASSIS STYLE	
	X	PROD. STYLE

-WIRING TABLE-

T	P	W	XLR OUT A	XLR OUT B	USED FOR
1	A	1			EXCITATION +
2	B	2			+ SIGNAL IN
3	C	3			- SIGNAL IN
4	D	4			EXCITATION -
5			1		OUTPUT A
6			2	2	SIGNAL GROUND
7				1	OUTPUT B
			3	3	CHASSIS GROUND

2 SEE TABLE FOR WIRING.

1 FOR 220 VOLT OPTION REPLACE 3.0 AMP FUSE WITH 1.5 AMP VPN 2266-1500 AND REVERSE THE VOLTAGE SELECTOR CARD SO THAT CORRECT VOLTAGE IS READABLE WHEN INSTALLED.

NOTES: UNLESS OTHERWISE SPECIFIED.

CODE IDENT NO. 33107

DIM UNLESS NOTED DEC. XXX ±.06 FRAC. & DEC. ±1/2 ANGLES ± 1° DIAMETERS WITH SAME & SHALL BE CONCENTRIC WITHIN .005 TIR. SURFACES MUST BE FLAT WITHIN .002 PER IN MAX FILLET .015 UNLESS NOTED DEBURR EDGES .005 MAX UNLESS NOTED SURFACE FINISH 125" UNLESS NOTED DRILLED HOLE TOL PER ANSI B97

SCALE 1/2 | Validyne ENGINEERING CORPORATION NORTHRIDGE, CALIFORNIA 91324

DWN ED 7-24-85 | MODEL MC1-10

CK'D JHA 7-25-85 | MAT'L

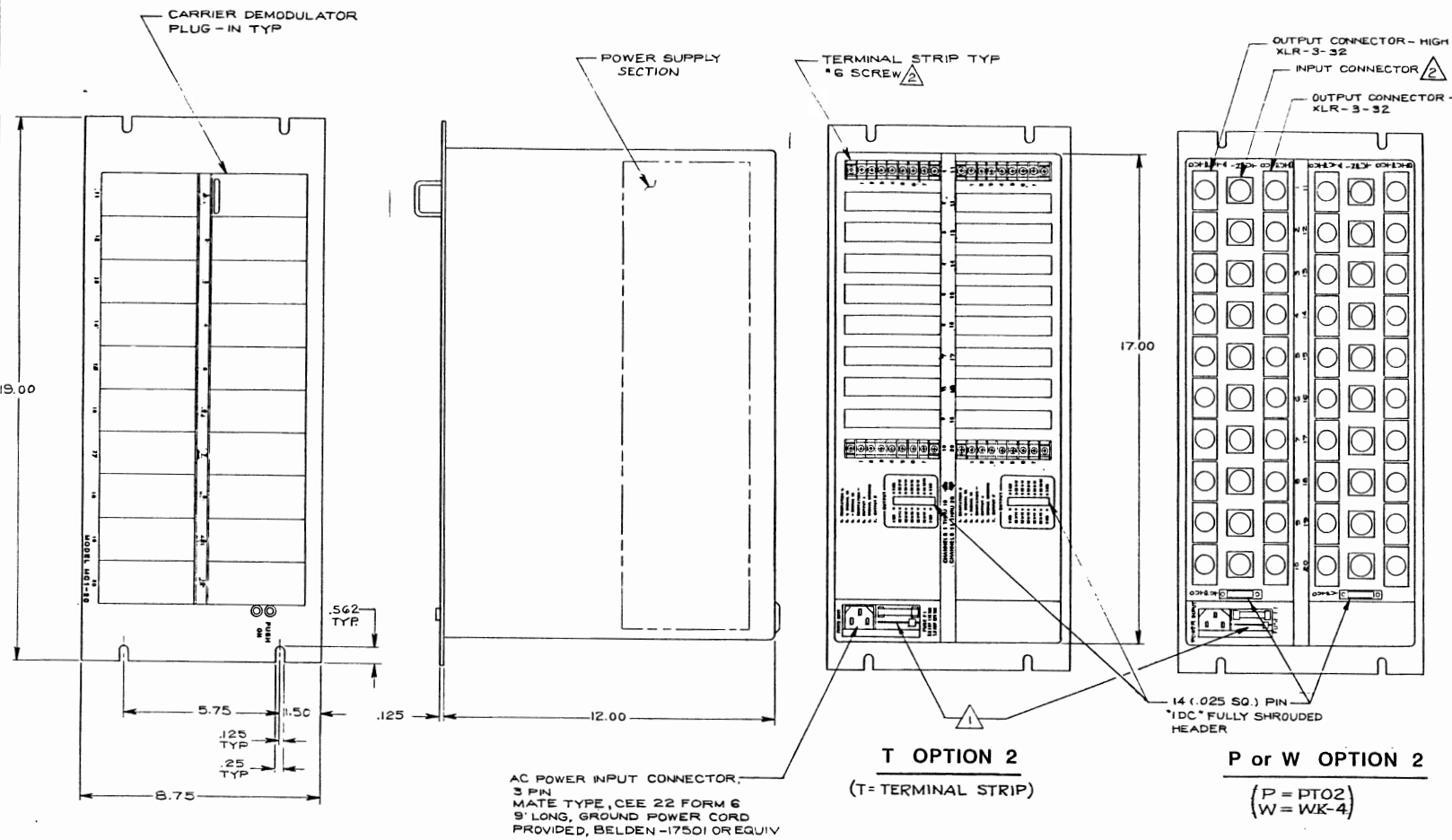
APP'D JHA | FINISH

TITLE OUTLINE DRAWING CARRIER DEMODULATOR SYSTEM

D MC1-10

MC1-20

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
F	ADDED OPTIONS. SEE DCN	7/1/82	ED



T OPTION 2

(T = TERMINAL STRIP)

P or W OPTION 2

(P = PT02)
(W = WK-4)

MC1 MODULE CASES

MC1-10-P-1-A-X

1ST OPTION	NUMBER OF CHANNELS	
	03	3 (FUTURE)
	10	10
	20	20
(2) 2ND OPTION	CONNECTORS	
	P	PT02/XLR (STD)
	T	TERM STRIP
	W	WK4/XLR
3RD OPTION	INPUT VOLTAGE	
	1	110 VAC (STD)
	2	220 VAC
4TH OPTION	CARRIER FREQUENCY	
	A	3K HZ (STD)
	B	5K HZ
	C	10K HZ
	D	20K HZ
5TH OPTION	CHASSIS STYLE	
	X	PROD. STYLE

— WIRING TABLE —

T	P	W	XLR OUT A	XLR OUT B	USED FOR
1	A	1			EXCITATION +
2	B	2			+ SIGNAL IN
3	C	3			- SIGNAL IN
4	D	4			EXCITATION -
5			1		OUTPUT A
6			2	2	SIGNAL GROUND
7				1	OUTPUT B
			3	3	CHASSIS GROUND

(2) SEE TABLE FOR WIRING.

(1) FOR 220 VOLT OPTION REPLACE 3.0 AMP FUSE WITH 1.5 AMP VPN 2266-1500 AND REVERSE THE VOLTAGE SELECTOR CARD SO THAT CORRECT VOLTAGE IS READABLE WHEN INSTALLED

NOTES: UNLESS OTHERWISE SPECIFIED.

CODE IDENT NO. 33107

UNLESS NOTED DEC XXX FRAC. & DEC. XX ANGLES ± 1/2° DIAMETERS WITH SAME & SHALL BE CONCENTRIC WITHIN .005 TIR SURFACES MUST BE FLAT WITHIN .002 PER IN MAX FILLET .015 UNLESS NOTED DEBURR EDGES .005 MAX UNLESS NOTED SURFACE FINISH "63" UNLESS NOTED DRILLED HOLE TOL "PER ANSI/OSM" ±.06

SCALE 1/2 | Validyne ENGINEERING CORPORATION NORTHRIDGE, CALIFORNIA 91324

DWN ED 7/1/82 | MODEL MC1-20

CKD [illegible] | MATL

APPD [illegible] | FINISH

TITLE OUTLINE DRAWING CARRIER DEMODULATOR SYSTEM